
CLAY PRODUCTS.

(899)

CLAY PRODUCTS.

By JEFFERSON MIDDLETON, *Expert Special Agent.*

This report presents the statistics of the clay-working industries for the calendar year 1899. On the whole there has been a considerable falling off from 1890 in the commoner products; while the higher grades, almost without exception, show great gains, the value of pottery, terra cotta, and fire-clay products having nearly doubled. The year 1890 was unquestionably a very prosperous one in the building trades, and therefore one of the most prosperous years in the history of the brick manufacture, but there was a depression in 1893, from which the recovery was slow. The comparison of 1890 with 1899 is, therefore, for the manufacture of brick, a comparison between a year of unusual prosperity and one of incomplete recovery. Moreover, the greatly increased proportion of apartment and steel-frame buildings among new constructions has in great measure shifted the demand from common brick to terra cotta and the more fancy products.

Special schedules for the inquiry were prepared with the idea of obtaining additional statistics relative to the cost of each of the important materials entering into the manufacture, the quantity (where practicable) and value of the various products, and the kinds and number of machines and kilns employed. These schedules were known as Special Schedule No. 5 and Special Schedule No. 6. The former was intended to be used for plants manufacturing only building and paving brick and draintile, while the latter was mainly for plants making higher grades of ware, though it embraced all grades. The only differences were in questions relating to materials, products, machinery, and kilns.

In the case of most clay products, total value is the only available criterion of production. To give the number made or length of draintile laid, for example, would afford no adequate measure of the quantity produced, owing to the great differences in their diameter. Nor would the value per 1,000 of the various kinds of tile be of assistance, since sizes vary from 4 to 12 inches, or even greater. Especially in the pottery industry was the need of a unit of measure felt, but it was found impracticable to use a unit which would be of any value.

Prior to the census of 1890, the clay-working industries were not the subject of a special report, being

merely treated in general tables showing the industrial condition of the country. No subdivision of value of products was attempted at the census of 1850, further than as follows: Brick, \$6,610,731; fire brick, \$12,009; earthenware, \$100,556; and pottery, \$1,466,063. At the census of 1860 the value of products was reported as follows: Brick, \$10,253,734; fire brick, \$493,400; draintile, \$516,013; terra cotta ware, \$18,000; pottery and stoneware, \$2,463,681; and porcelain ware, \$243,000. At the census of 1870 brick was reported with a value of \$29,028,359; drainpipe, \$1,294,256; and stone and earthenware, \$6,045,536. At the census of 1880 the value of clay products was reported as follows: Brick and tile, \$32,833,587; stone and earthenware, \$7,942,729; drain and sewer pipe, \$480,261; and terra cotta ware, \$554,343. At the census of 1890 a report was made commensurate, for the first time, with the importance of the industry.

The statistics in the report for the census of 1900 cover all the wares known as clay products—those in which the essential raw material is clay—from common brick to the higher grades of pottery. It has been found necessary, however, because there was no other place so appropriate, to include also silica and magnesia fire brick, most largely made in Pennsylvania. The figures also embrace, in "all other products," goods made by manufacturers whose main industry was that of clay working, but who operated cider, gin, or saw mills in connection therewith. In some instances contract work has been included. In order to group similar materials and products, the exact line of division between the two classifications is not observed in some of the tables.

The modern use of clay products is extending rapidly, and in many ways not thought of a decade ago, especially in structural work and in paving. This tendency must necessarily continue, not only because the plastic nature of clay allows it to be molded into varied and attractive designs, and because the product affords the most fireproof and durable building material known, but also because of the growing scarcity of timber in the more readily accessible localities.

There is probably no variety of clay products, from the commonest brick to the finest art china, that is not made in the United States, though unfortunately the quantity of the highest grade of china is very small.

While the production of this class of ware is increasing, it is still the fact that most of the finest products of the potter's art, on the American market or in the collectors' hands to-day, are imported. But the successful conduct of such establishments as the Rookwood and Newcomb

potteries gives promise of an increased demand for the art productions of the United States.

Table 1 is a comparative summary of the statistics for clay products as returned at the censuses of 1850 to 1900, inclusive, with percentages of increase.

TABLE 1.—CLAY PRODUCTS: COMPARATIVE SUMMARY, 1850 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	DATE OF CENSUS.					PER CENT OF INCREASE.					
	1900 ¹	1890	1880	1870	1860	1850	1890 to 1900	1880 to 1890	1870 to 1880	1860 to 1870	1850 to 1860
Number of establishments.....	6,423	6,585	6,388	3,959	2,240	2,121	21.7	2.4	61.2	76.7	5.6
Capital.....	\$148,088,323	\$108,705,070	\$85,089,989	\$26,776,011	\$9,707,952	\$5,217,231	36.2	210.2	30.9	175.8	86.1
Salaried officials, clerks, etc., number..	5,203	5,291	(⁴)	(⁴)	(⁴)	(⁴)	17.3				
Salaries.....	\$5,036,195	\$4,254,943	(⁴)	(⁴)	(⁴)	(⁴)	18.4				
Wage-earners, average number.....	105,093	123,156	76,576	50,167	24,569	19,801	214.2	60.8	52.6	104.2	24.1
Total wages.....	\$39,575,070	\$38,578,389	\$17,044,259	\$13,332,547	\$5,224,859	\$4,890,422	2.6	126.3	27.8	155.2	6.8
Men, 16 years and over.....	98,127	115,600	66,914	45,833	24,038	19,139	215.1	72.8	47.6	88.6	25.8
Wages.....	\$37,957,248	\$37,426,873	(⁴)	(⁴)	(⁴)	(⁴)	1.4				
Women, 16 years and over.....	4,557	2,235	1,216	576	531	662	103.9	83.8	111.1	8.5	219.8
Wages.....	\$1,142,579	\$536,269	(⁴)	(⁴)	(⁴)	(⁴)	113.1				
Children, under 16 years.....	3,009	5,321	8,446	4,258	(⁴)	(⁴)	243.5	237.0	98.4		
Wages.....	\$476,248	\$615,247	(⁴)	(⁴)	(⁴)	(⁴)	22.8				
Miscellaneous expenses.....	\$6,845,040	\$7,111,776	(⁴)	(⁴)	(⁴)	(⁴)	3.8				
Cost of materials used.....	\$22,921,384	\$18,257,998	\$12,683,897	\$9,581,162	\$2,930,547	\$1,768,374	25.5	48.9	33.1	225.2	65.7
Value of products.....	\$95,533,862	\$89,827,765	\$41,810,920	\$36,368,151	\$18,987,823	\$8,189,359	6.4	114.8	15.0	160.0	70.8

¹The report for the Twelfth Census is for the calendar year 1899.

²Decrease.

³Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See Table 18.)

⁴Not reported separately.

⁵Not reported.

The manufacture of clay products has had a steady growth in all important particulars, except two, from 1850 to the close of the century, the greatest gain in value of products being made from 1880 to 1890, when it was \$48,016,865, or 114.8 per cent; the next greatest gain being from 1860 to 1870, when it was \$22,380,323, or 160 per cent. There has been a singular uniformity in the increases in value of products for the three alternate decades, that between 1850 and 1860 being \$5,798,469, that between 1870 and 1880, \$5,442,769, and that between 1890 and 1900, \$5,706,077.

There has been a decrease of 14.2 per cent since 1890 in the average number of wage-earners, due largely to differences in classification which are explained elsewhere. The increase in the use of labor-saving machinery has also had an effect. Notwithstanding this decrease the aggregate wages paid increased 2.6 per cent. The average number of men and of children decreased, but the average number of women increased, owing to a larger demand for decorators of pottery. The wages of women show a slightly greater rate of increase than their average number.

The decrease since 1890 in the number of salaried officials, clerks, etc., 1,088, or 17.3 per cent, is accounted for by the fact that proprietors and firm members were included in this classification at the Eleventh Census, while at the Twelfth Census they were not. The increase in capital from 1890 to 1900 is explained by the remarkable increase in the pottery, terra cotta, and fire-clay manufacture. The plants required relatively more capital than those for brick and tile, thus their gain more than offset the loss in the brick and tile

plants. The disproportionate increase in capital from 1880 to 1890, was partly due to greater completeness of returns in the latter year.

Table 2 shows the rank of states by value of products, with percentage each produced, 1890 and 1900.

TABLE 2.—CLAY PRODUCTS: RANK OF STATES BY VALUE OF PRODUCTS, WITH PERCENTAGES OF TOTAL, 1890 AND 1900.

STATES AND TERRITORIES.	1900. ¹			1890.		
	Rank.	Value of products.	Percentage of total.	Rank.	Value of products.	Percentage of total.
United States.....		\$95,533,862	100.0		\$89,827,765	100.0
Alabama.....	23	883,129	0.9	27	802,331	0.9
Arizona.....	44	101,758	0.1	46	4,800	(⁵)
Arkansas.....	34	386,800	0.4	29	520,731	0.6
California.....	12	1,555,738	1.7	9	2,266,914	2.5
Colorado.....	21	1,071,858	1.1	10	2,238,618	2.5
Connecticut ²	20	1,074,202	1.1	24	863,040	1.0
Delaware.....	38	167,692	0.2	37	268,534	0.3
District of Columbia.....	33	481,145	0.5	23	961,587	1.1
Florida.....	41	137,958	0.1	40	119,260	0.1
Georgia.....	16	1,259,577	1.3	16	1,412,732	1.6
Idaho.....	45	46,609	(²)	45	9,800	(⁵)
Illinois.....	5	7,224,915	7.6	5	7,956,082	8.9
Indiana.....	6	4,222,529	4.4	7	3,142,451	3.5
Indian Territory.....	47	35,075	(²)			
Iowa.....	8	2,224,920	2.3	14	1,775,165	2.0
Kansas.....	25	753,411	0.8	23	690,574	0.8
Kentucky.....	14	1,355,094	1.4	22	1,206,181	1.3
Louisiana.....	31	553,465	0.6	34	336,495	0.4
Maine.....	27	662,235	0.7	26	804,074	0.9
Maryland.....	11	1,679,166	1.8	12	1,985,828	2.2
Massachusetts.....	9	2,181,510	2.3	8	2,819,760	3.1
Michigan.....	15	1,280,590	1.3	17	1,467,957	1.6
Minnesota.....	17	1,217,743	1.3	19	1,331,339	1.5
Mississippi.....	32	540,725	0.6	33	339,939	0.4
Missouri.....	7	3,650,400	3.8	6	4,782,619	5.3
Montana.....	36	314,340	0.3	38	238,610	0.3
Nebraska.....	24	841,305	0.9	11	2,173,632	2.4
Nevada ⁴	48	17,850	(²)			

¹The report for the Twelfth Census is for the calendar year 1899.

²Less than one-tenth of 1 per cent.

³Includes Rhode Island in 1900.

⁴Included in "all other states" for 1890.

TABLE 2.—CLAY PRODUCTS: RANK OF STATES BY VALUE OF PRODUCTS, WITH PERCENTAGES OF TOTAL, 1890 AND 1900—Continued.

STATES AND TERRITORIES.	1900. ¹			1890.		
	Rank.	Value of products.	Per cent- age of total.	Rank.	Value of products.	Per cent- age of total.
New Hampshire	30	\$570, 287	0.6	25	\$835, 156	0.9
New Jersey	3	10, 786, 673	11.3	4	7, 991, 611	8.9
New Mexico ²	43	108, 090	0.1			
New York	4	8, 073, 769	8.5	3	8, 806, 273	9.8
North Carolina	26	725, 016	0.8	32	346, 270	0.4
North Dakota	39	158, 874	0.2	42	45, 775	(³)
Ohio	1	16, 480, 812	17.3	2	10, 860, 938	12.1
Oklahoma	40	149, 712	0.2	44	11, 500	(³)
Oregon	35	317, 978	0.3	30	461, 648	0.5
Pennsylvania	2	14, 081, 844	14.7	1	11, 148, 668	12.4
South Carolina	28	596, 693	0.6	36	279, 889	0.3
South Dakota	46	46, 150	(³)	39	134, 650	0.1
Tennessee	22	944, 610	1.0	21	1, 277, 397	1.4
Texas	18	1, 212, 266	1.3	20	1, 311, 270	1.5
Utah	37	215, 049	0.2	31	421, 658	0.5
Vermont	42	131, 525	0.1	41	119, 089	0.1
Virginia	19	1, 089, 399	1.2	18	1, 361, 438	1.5
Washington	29	583, 857	0.6	15	1, 529, 479	1.7
West Virginia	13	1, 541, 239	1.6	35	304, 865	0.3
Wisconsin	10	1, 810, 206	1.9	13	1, 785, 442	2.0
Wyoming	49	8, 450	(³)	48	25, 900	(³)
All other states ⁴					315, 300	0.4

¹ The report for the Twelfth Census is for the calendar year 1899.

² Included in "all other states" for 1890.

³ Less than one tenth of 1 per cent.

⁴ Includes establishments in Indian Territory, Nevada, and New Mexico.

From this table it will be seen that Ohio was first in rank at the census of 1900, with products valued at \$16,480,812, or 17.3 per cent of the total products; in 1890 it was second, with products valued at \$10,860,938, or 12.1 per cent. Pennsylvania was second, with products valued at \$14,081,844, or 14.7 per cent; it was first in rank at the census of 1890, with a product valued at \$11,148,668. The gain of \$5,619,874 in Ohio is largely due to the rapid growth of the pottery

industry, which increased from \$2,970,763 in 1890 to \$6,994,805 at the census of 1900, while Pennsylvania's pottery products were valued at \$1,164,517, compared with \$561,248 in 1890. New York, third in 1890, with products valued at \$8,806,273, fell to fourth rank in 1900, with products valued at \$8,073,769; New Jersey changing places with New York, rose from fourth to third rank, with products valued at \$7,991,611, or 8.9 per cent of the total in 1890, to \$10,786,673, or 11.3 per cent of the total in 1900.

Illinois was fifth in rank in both years, though the value of its products declined from \$7,956,082, or 8.9 per cent of the total in 1890, to \$7,224,915 in 1900, or 7.6 per cent of the total. Missouri, sixth in 1890, was seventh in 1900; while Indiana rose from seventh rank in 1890 to sixth in 1900. Other noteworthy changes were Colorado, which, tenth in 1890, fell to twenty-first in 1900; Nebraska from eleventh to twenty-fourth; and Washington from fifteenth to twenty-ninth. West Virginia rose from thirty-fifth to thirteenth. This was due to the development of the pottery industry. The value of pottery products in 1890 was only \$7,300, but at the census of 1900 it was \$585,310.

Table 3 is a summary for all establishments, 1900, giving, in addition to those shown in Table 1, the statistics for establishments with a product of less than \$500, for governmental establishments, and for educational, eleemosynary, and penal institutions. As the three latter classes were not reported at previous censuses, they are omitted from the other tables.

Of the 3,963 establishments of all classes shown in this table, 519, or 7.5 per cent, were those having a

TABLE 3.—CLAY PRODUCTS: SUMMARY FOR ALL ESTABLISHMENTS, 1900.¹

CLASSES.	Number of establishments.	Capital.	Proprietors and firm members.	WAGE-EARNERS.		Miscellaneous ex- penses.	COST OF MATERIALS USED.				Value of products.
				Average number.	Total wages.		Total.	Purchased in raw state.	Purchased in partially manufactured form.	Fuel, freight, etc.	
Total	6, 963	\$148, 606, 784	8, 218	106, 233	\$39, 643, 248	\$6, 853, 467	\$22, 933, 414	\$3, 975, 044	\$4, 480, 041	\$14, 523, 329	\$95, 837, 370
Establishments with a product of less than \$500	519	359, 836	622	306	47, 054	6, 891	27, 888	2, 723	2, 920	22, 245	144, 871
Governmental establishments; and educational, eleemosynary, and penal institutions	21	208, 625	.....	234	21, 124	1, 536	34, 142	3, 776	1, 588	28, 778	208, 637
All other establishments	6, 423	148, 038, 323	7, 596	105, 693	\$9, 575, 070	6, 845, 040	22, 921, 384	3, 968, 545	4, 475, 533	14, 477, 306	95, 633, 862

¹ The report for the Twelfth Census is for the calendar year 1899.

product of less than \$500, but the value of their product was only two-tenths of 1 per cent of the total value of the products of the industry. In addition to the 3,963 active establishments in the industry during 1899, with a capital of \$148,606,784, as shown in Table 3, there were 464 idle establishments, with a capital of \$6,330,752.

Table 4 shows the cost of some of the principal materials used in the manufacture of clay products, 1900.

TABLE 4.—CLAY PRODUCTS: COST OF MATERIALS, 1900.¹

	Cost.	Per cent of total.
Total	\$22, 921, 384	100.0
Clay	3, 548, 336	15.5
Fuel	12, 633, 680	55.1
Miscellaneous	6, 153, 170	26.8
Packing materials	586, 198	2.6

¹ The report for the Twelfth Census is for the calendar year 1899.

Owing to the different methods of classification at the Eleventh and Twelfth censuses, it is impossible to make comparison of the details. The amount expended for fuel was \$12,633,680, or 55.1 per cent of the total cost of materials. In the cost of clay, \$3,548,336, or 15.5 per cent of the total, is included only the clay actually purchased and not that mined by the manufacturers by their own men, whose compensation is given in wages paid. The miscellaneous item includes all other materials except packing materials. The details of these will be found in Tables 6, 10, 17, and 18, treating of the materials used in the separate branches of the manufacture.

Table 5 is a comparative summary of the kinds and value of the principal clay products for 1890 and 1900, with the per cent of increase.

TABLE 5.—CLAY PRODUCTS: COMPARATIVE SUMMARY, KIND AND VALUE OF PRODUCTS, WITH INCREASE AND PER CENT OF INCREASE, 1890 AND 1900.

	1900 ¹	1890	Increase.	Per cent of increase.
Aggregate value	\$95,533,862	\$89,827,785	\$5,706,077	6.4
Brick, tile, and terra cotta:				
Total value	78,336,447	77,488,493	847,954	1.1
Common brick	39,674,749	48,810,271	29,135,522	218.7
Pressed brick	2,537,912	5,973,902	2,435,990	257.5
Fancy colored front brick	2,082,000	187,920	1,894,080	1,007.9
Vitrified brick and blocks	4,828,456	982,440	3,846,016	391.5
Electrical conduits	685,273	53,500	631,773	1,180.9
Sewer pipe	4,560,334	5,394,921	284,587	215.5
Drain tile	3,662,184	5,009,804	2,347,620	226.9
Flue linings	310,989	68,184	242,805	356.1
Stove linings	416,235	151,023	265,212	175.6
Furnace fittings	1,043,085	161,469	881,616	546.0
Gas retorts	196,567	24,408	172,159	705.3
Glass-melting pots	407,141	312,343	94,798	30.4
Fire brick	8,626,562	6,318,770	2,317,792	36.7
Roofing, floor, and encaustic tile	1,276,300	795,958	480,342	60.3
Hollow brick, fireproofing, and terra cotta lumber	1,665,031	402,750	1,262,281	313.4
Chimney tops	242,289	101,208	141,081	139.4
Architectural terra cotta	2,027,532	1,431,228	596,304	41.7
All other brick, tile, and terra cotta products	4,083,808	1,308,394	2,775,414	212.1
Pottery products:				
Total value	17,197,415	12,839,292	4,358,123	39.4
Stoneware	1,970,710	2,056,463	285,753	24.2
Yellow and Rockingham ware	159,553	439,553	280,000	263.7
C. C. or cream-colored ware	1,540,488	1,226,161	314,327	25.6
White granite ware	1,737,101	1,676,579	110,522	6.6
Semivitreous porcelain ware	3,048,762	669,107	2,379,655	355.6
China (porcelain)	1,255,978	460,334	795,644	172.8
Art pottery and porcelain	629,402	957,168	2327,766	234.2
All other pottery products	6,805,421	4,853,927	1,951,494	40.2

¹ The report for the Twelfth Census is for the calendar year 1899.

² Decrease.

The separation in this table is between products used for building and other purposes, and the characteristic products of pottery establishments. Of the total increase of \$5,706,077, shown in this table, the coarser products as a whole—brick, tile, terra cotta, etc.—contributed \$847,954, or 14.9 per cent, and the pottery products, \$4,858,123, or 85.1 per cent. The increase in the coarser wares over 1890 was only 1.1 per cent, and was almost exclusively in the higher grades, the common and pressed brick showing a decided decline. The decline in the common brick output is undoubtedly due to changes in methods of construction, the modern

steel-frame building, with its large use of fireproofing and hollow building blocks in place of common brick, the increasing use of cement and vitrified brick for sidewalks, etc. Another cause for the small increase in brick and tile products is found in the fact that the building trades are early affected by seasons of business depression and are the last to revive; and evidently, at the taking of the Twelfth Census, the brick-making industry had not fully recovered from the panic of 1893.

The decrease in the output of pressed brick was partially offset by the increase of fancy colored brick. Vitrified brick and blocks also show a remarkable gain in 1900 over 1890.

The manufacture of electrical conduits, first reported in 1890, with a value of \$53,500, has made the greatest proportional gain, the increase in 1900 being \$631,773.

Drain tile showed a decline of 26.9 per cent, or from \$5,009,804 in 1890 to \$3,662,184 in 1900. This product is one that varies from season to season, the demand being regulated by the amount of rainfall in the large drain tile-consuming region—the Middle Western states.

The higher grades of tile, such as roof, floor, and encaustic tile, showed a noteworthy increase of from \$795,958 in 1890 to \$1,276,300 in 1900, a gain of \$480,342, or 60.3 per cent. This branch of clay manufacture has developed greatly in the last few years. The fireproofing and hollow-block industry made a substantial gain, from \$402,750 in 1890 to \$1,665,031 in 1900, an increase of \$1,262,281, or 313.4 per cent. The production of architectural terra cotta increased in value from \$1,431,228 in 1890 to \$2,027,532 in 1900, a gain of \$596,304, or 41.7 per cent.

While pottery products, according to the subdivision in this table, made a gain of \$4,858,123, or 39.4 per cent over 1890, which was 85.1 per cent of the total gain in all clay products, the same condition obtained in this branch of the industry as in the brick, tile, and terra-cotta branch; that is, the decreases were confined to the commoner lines of wares, namely, the stoneware and yellow Rockingham ware, while the other grades, with the exception of art pottery and porcelain, showed increases. The small increase in production of C. C. ware is probably due to the reluctance of manufacturers to classify their ware as this grade. The difference between C. C., white granite, and semivitreous porcelain is slight, and these designations are principally trade names. Perhaps the fairer way would be to combine these three items for 1890 and 1900, giving \$3,571,847 and \$6,376,351, respectively, with a gain of \$2,804,504, or 78.5 per cent.

BRICK AND TILE.

The detailed summary for the brick and tile branch of the clay manufacture is Table 17, the third of the general tables following the text of this report. Pennsylvania led, with 11.6 per cent of the total value of products; New York was second, with 11.1 per cent; and Illinois was third, with 9.9 per cent.

Table 6 shows the kinds and cost of materials used in brick and tile manufacture, 1900, with the percentage each is of the total.

TABLE 6.—BRICK AND TILE: COST OF MATERIALS, 1900.¹

	Cost.	Per cent of total.
Total	\$11,006,148	100.0
Clay	335,668	3.1
Coal used as an ingredient	131,658	1.2
Sand	189,803	1.7
Manganese	19,004	0.2
Salt	6,460	0.1
Iron	2,641	(²)
Carbonate of barium	8,355	0.1
Fuel	8,774,852	79.7
Rent of power and heat	9,768	0.1
Mill supplies	411,935	3.7
All other materials ³	510,059	4.6
Freight	605,945	5.5

¹ The report for the Twelfth Census is for the calendar year 1899.

² Less than one-tenth of 1 per cent.

³ Includes "coloring matter," \$9,622.

Table 6 shows that the cost of all materials was \$11,006,148. The clay is that actually purchased, and does not include the clay mined by men employed at the plant, whose wages are included in the amount paid to wage-earners. No attempt was made to arrive at the value of the clay so mined, it being such an integral part of the process of manufacture that it is deemed impossible to separate it. Furthermore, in most plants, the capital given includes the value of the land from which the clay was taken. Fuel is by far the material of greatest cost, that used under boilers and in burning the product amounting to \$8,774,852, or 79.7 per cent, while if the coal used as an ingredient (also efficient as fuel) be added, it would make the fuel cost \$8,906,510, or 80.9 per cent of the total. Undoubtedly far the larger part of the expense for freight was for freight on fuel, and if this be also included the cost of fuel would rise to 86.4 per cent of the total. The mill supplies were valued at \$411,935, or 3.7 per cent of the materials used.

Table 7 shows the value of the brick and tile products by kind, and the percentage each product is of the total clay products, 1900, as well as of the brick and tile products.

TABLE 7.—BRICK AND TILE: KIND AND VALUE OF PRODUCTS, 1900.¹

	Value.	Per cent of total	Per cent of total value of all clay products. ²
Total	\$51,270,476	100.0	53.7
Common brick	38,650,478	75.4	40.5
Red front brick	2,897,171	4.7	2.5
Fancy colored front brick (all except red)	1,601,441	3.1	1.7
Ornamental-shaped brick (all not plain rectangular)	429,588	0.9	0.4
Vitrified paving brick	3,857,179	7.5	4.0
Drain tile	3,195,434	6.2	3.3
All other products	1,139,185	2.2	1.2

¹ The report for the Twelfth Census is for the calendar year 1899.

² Total value of all clay products, \$95,533,862.

The brick and tile manufacture produced 53.7 per cent in value of all clay products; common brick were 40.5 per cent. Of the total value of products of the brick and tile manufacture alone, the value of common brick constituted 75.4 per cent; of paving brick, 7.5 per cent; of drain tile, 6.2 per cent; and of red front brick, 4.7 per cent.

Table 8 is a statement of the average price per thousand of the various kinds of building brick, 1900, by states and territories.

TABLE 8.—BRICK AND TILE: AVERAGE PRICE PER THOUSAND OF BRICK, BY STATES AND TERRITORIES, 1900.¹

STATES AND TERRITORIES.	Common brick.	Fancy colored front brick (all except red).	Ornamental-shaped brick (all not plain rectangular brick).	Vitrified paving brick.	Red front brick (both pressed and wire-cut).	Enamelled brick.
United States	\$5.18	\$13.89	\$29.01	\$8.17	\$8.98	\$57.04
Alabama	5.59	12.50	35.00	9.08	6.08	.....
Arizona	6.49	.....	60.00	.....	.....	.....
Arkansas	6.40	.....	28.57	9.77	9.83	.....
California	6.18	34.17	50.87	10.00	11.24	75.00
Colorado	5.59	18.30	57.58	10.13	10.19	.....
Connecticut and Rhode Island	4.99	23.00	36.36	10.00	8.75	.....
Delaware	7.51	.....	45.00	.....	10.65	.....
District of Columbia	7.85	80.00	.....	.....	12.24	.....
Florida	5.05	10.00	.....	.....	.....	.....
Georgia	4.80	15.00	28.44	6.25	8.83	.....
Idaho	7.02	.....	.....	.....	.....	.....
Illinois	4.87	10.52	37.01	7.96	8.35	65.82
Indiana	4.74	10.00	25.70	9.19	9.72	.....
Indian Territory	6.18	.....	.....	.....	.....	.....
Iowa	6.03	11.07	31.33	7.61	8.31	.....
Kansas	5.14	.....	29.83	6.80	8.33	.....
Kentucky	5.26	.....	15.68	10.20	8.09	.....
Louisiana	5.05	.....	.....	.....	8.54	.....
Maine	5.49	.....	10.00	9.22	7.01	.....
Maryland	6.12	28.95	50.34	14.00	7.29	42.00
Massachusetts	5.45	32.93	48.69	.....	13.87	.....
Michigan	4.65	14.71	22.12	12.00	13.68	.....
Minnesota	5.19	13.00	35.20	.....	7.78	.....
Mississippi	5.76	.....	.....	.....	10.69	.....
Missouri	5.32	12.19	46.69	8.36	8.27	.....
Montana	6.56	18.50	20.63	17.00	12.45	.....
Nebraska	6.55	.....	70.22	7.15	14.89	.....
Nevada	8.36	.....	.....	.....	.....	.....
New Hampshire	5.12	.....	.....	.....	9.71	.....
New Jersey	4.58	16.95	24.09	12.30	13.80	54.89
New Mexico	7.47	13.00	.....	.....	10.00	.....
New York	4.23	14.63	32.53	10.00	7.46	.....
North Carolina	5.06	30.00	.....	5.74	6.89	.....
North Dakota	5.82	15.00	.....	.....	12.00	.....
Ohio	5.19	10.71	16.01	7.78	8.78	.....
Oklahoma	6.52	.....	.....	.....	16.15	.....
Oregon	6.48	35.56	27.84	.....	7.62	60.00
Pennsylvania	5.79	12.95	22.23	7.89	9.16	75.66
South Carolina	4.58	11.92	.....	.....	6.51	.....
South Dakota	7.02	.....	.....	.....	.....	.....
Tennessee	4.91	9.21	20.33	11.99	6.05	.....
Texas	5.43	7.75	18.84	9.83	8.63	.....
Utah	5.78	8.33	22.10	.....	11.58	.....
Vermont	5.01	.....	.....	.....	9.00	.....
Virginia	5.94	17.15	33.51	10.00	10.11	.....
Washington	7.23	21.01	70.00	15.22	21.61	.....
West Virginia	5.40	11.17	10.89	7.72	6.79	.....
Wisconsin	6.00	8.02	21.70	15.00	9.15	.....
Wyoming	7.98	.....	.....	.....	19.17	.....

¹ The report for the Twelfth Census is for the calendar year 1899.

The average price for common brick for the United States was \$5.18 per thousand, while the price ranged from \$8.36 per thousand in Nevada to \$4.23 per thousand in New York. In Minnesota and Ohio the price was \$5.19, or practically that for the whole country. The

red front brick varied from \$6.05 in Tennessee to \$21.61 in the state of Washington, while the average for the United States was \$8.98. The other kinds of brick show even greater variations in price, due to differences in the cost of manufacture and in the character of the local product in different states.

Table 9 is a comparative summary of the brick and tile manufacture, 1900, along the Hudson River from Troy to New York city, in Philadelphia county, Pa., and in Cook county, Ill., these being the three great building-brick centers of the United States. For the purpose of including all of the establishments along the Hudson River, Bergen County, N. J., whose principal market is Greater New York, where practically the entire product of Hudson River brick is sold, is included. Likewise all yards in Philadelphia county, Pa., and Cook county, Ill., are included, their product being almost altogether consumed in Philadelphia and Chicago.

TABLE 9.—BRICK AND TILE: COMPARATIVE SUMMARY—HUDSON RIVER COUNTIES, COOK COUNTY, ILL., AND PHILADELPHIA COUNTY, PA., 1900.¹

	Hudson River counties, ²	Cook county.	Philadelphia county.
Number of establishments.....	121	35	37
Capital:			
Total.....	\$5,898,790	\$3,024,782	\$2,448,668
Land.....	\$1,858,009	\$1,119,500	\$541,496
Buildings.....	\$1,265,647	\$588,850	\$590,818
Machinery, tools, and implements.....	\$1,243,735	\$912,850	\$417,874
Cash and sundries.....	\$1,526,399	\$409,582	\$898,385
Proprietors and firm members.....	152	43	49
Salariat officials, clerks, etc.:			
Total number.....	110	54	47
Total salaries.....	\$107,578	\$77,744	\$53,598
Officers of corporations—			
Number.....	15	16	5
Salaries.....	\$23,611	\$23,672	\$10,100
General superintendents, managers, clerks, etc.—			
Total number.....	95	38	42
Total salaries.....	\$83,967	\$54,072	\$43,498
Men—			
Number.....	94	37	42
Salaries.....	\$83,187	\$53,172	\$43,498
Women—			
Number.....	1	1	0
Salaries.....	\$780	\$900	0
Wage-earners, including pieceworkers, and total wages:			
Average number.....	5,184	1,183	1,451
Total wages.....	\$2,156,449	\$634,915	\$678,201
Men, 16 years and over—			
Average number.....	5,087	1,174	1,430
Wages.....	\$2,144,636	\$638,828	\$673,296
Children, under 16 years—			
Average number.....	47	9	21
Wages.....	\$11,813	\$1,087	\$4,905
Miscellaneous expenses:			
Total.....	\$441,558	\$77,928	\$195,100
Rent of works.....	\$210,631	\$3,550	\$49,088
Taxes, not including internal revenue.....	\$88,392	\$9,900	\$6,498
Rent of offices, interest, insurance, and all sundry expenses not hitherto included.....	\$196,010	\$61,278	\$189,570
Contract work.....	\$1,525	\$3,200	0
Materials used:			
Total cost.....	\$835,588	\$297,687	\$288,085
Clay purchased—			
Tons.....	8,374	3,355	40,801
Cost.....	\$8,338	\$2,230	\$22,849
Coal, used as an ingredient—			
Tons.....	38,591	4,280	2,551
Cost.....	\$54,997	\$6,881	\$2,024
Sand—			
Tons.....	54,960	2,014	4,806
Cost.....	\$47,539	\$2,064	\$4,288
Manganese—			
Pounds.....			34,854
Cost.....			\$333

¹The report for the Twelfth Census is for the calendar year 1899.
²Includes Rensselaer, Albany, Columbia, Greene, Dutchess, Ulster, Putnam, Orange, Westchester, and Rockland counties, N. Y., and Bergen county, N. J.

TABLE 9.—BRICK AND TILE: COMPARATIVE SUMMARY—HUDSON RIVER COUNTIES, COOK COUNTY, ILL., AND PHILADELPHIA COUNTY, PA., 1900¹—Continued.

	Hudson River counties, ²	Cook county.	Philadelphia county.
Materials used—Continued.			
Total cost—Continued.			
Salt—			
Tons.....			7
Cost.....			\$85
Iron—			
Pounds.....			20,200
Cost.....			\$202
Coloring matter.....	\$1,226		\$100
Carbonate of barium.....	\$5,118		
Fuel.....	\$592,419	\$253,989	\$201,804
Rent of power and heat.....	\$1,515		\$5
Mill supplies.....	\$35,395	\$5,352	\$6,632
All other materials.....	\$52,452	\$7,849	\$1,499
Freight.....	\$36,589	\$19,342	\$37,919
Products:			
Total value.....	\$4,319,224	\$1,540,790	\$1,497,301
Common brick—			
Number of thousands.....	988,335	844,793	205,386
Value.....	\$4,058,869	\$1,535,245	\$1,212,063
Red front brick (both pressed and wire-cut)—			
Number of thousands.....			13,743
Value.....	12,500		\$145,162
Fancy colored front brick (all except red)—			
Number of thousands.....			4,665
Value.....			\$131,967
Ornamental-shaped brick (all brick not rectangular, plain brick)—			
Number of thousands.....			126
Value.....			\$8,122
Vitrified paving brick—			
Number of thousands.....	15,469		
Value.....	\$167,505		
Drain tile.....	\$8,000	\$4,420	
All other products.....	\$4,350	\$1,125	
Power:			
Number of establishments reporting.....	119	30	28
Total horsepower (owned).....	14,266	7,069	2,717
Engines—			
Steam—			
Number.....	154	47	43
Horsepower.....	14,248	7,069	2,717
Gas or gasoline—			
Number.....	1		
Horsepower.....	3		
Other power, horsepower.....	15		
Machinery:			
Clay-grinding machines—			
Disintegrators.....	77	38	23
Dry pans.....	13	5	6
All other.....	63	28	3
Clay-tempering machines—			
Ring pits.....	243	3	50
Pug mills.....	42	36	26
Wet pans.....		3	
All other.....	18	8	1
Molding machines—			
Soft mud.....	479	24	20
Stiff mud.....	24	35	12
Dry presses.....	2	8	8
Shape-brick power presses.....	21	8	12
Hand presses.....			81
Tile machines.....		1	
All other.....	12		
Mold sanders.....	228	1	17

¹The report for the Twelfth Census is for the calendar year 1899.
²Includes Rensselaer, Albany, Columbia, Greene, Dutchess, Ulster, Putnam, Orange, Westchester, and Rockland counties, N. Y., and Bergen county, N. J.

It is regretted that comparison can not be made with 1890. The table shows that the Hudson River region led in the manufacture, the value of its products being 58.7 per cent of the total value in this group. The average value of common brick per thousand along the Hudson River was \$4.10, probably the lowest price for brick of equal quality anywhere in the United States. The quantity reported, 988,335,000, was larger than that reported for any other region of the United States. In considering average wages, it should be remembered that the large majority of the yards are what are termed "summer yards," being operated only about one-half of the year.

For the benefit of those who desire the statistics relating solely to the New York portion of this region it may be stated that included in Table 8 are 9 establishments in Bergen county, N. J., with a capital of \$396,192, employing 239 wage-earners, paying \$116,403 in wages, and having a product of 58,259,000 common brick, valued at \$249,003.

POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS.

The detailed summary, by states and territories, of the manufacture of pottery, terra cotta, and fire-clay products, 1900, is Table 18, to be found in the general tables following the text of this report. Ohio led with 26.8 per cent of the total value of products, New Jersey being second, with 20.2 per cent, and Pennsylvania third, with 18.4 per cent.

Table 10 shows the kinds and cost of the materials used in the pottery, terra cotta, and fire-clay manufacture, 1900.

TABLE 10.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS: COST OF MATERIALS, 1900.¹

	Cost.	Per cent of total.
Total	\$11,915,236	100.0
China clay (domestic)	890,804	3.3
China clay (foreign)	171,790	1.4
Ball clay (domestic)	113,954	1.0
Ball clay (foreign)	116,629	1.0
Stoneware clay	171,161	1.4
Slip clay	17,830	0.2
Fire clay	1,554,228	13.0
Pipe clay	150,489	1.3
Terra cotta clay	133,339	1.1
Brick clay (purchased)	191,918	1.6
All other clay	200,526	1.7
Coal (used as an ingredient)	6,731	0.1
Sand	92,017	0.8
Manganese	25,914	0.2
Salt	24,766	0.2
Iron	13,184	0.1
Coloring matter	70,688	0.6
Carbonate of barium	15,073	0.1
Sawdust	19,687	0.2
Flint (quartz)	825,434	2.7
Feldspar	265,231	2.2
Plaster	120,545	1.0
Liquid and coin gold	117,422	1.0
Oxide of lead, zinc, and cobalt	225,099	1.9
Packing materials	586,198	4.9
Fuel	3,858,828	32.4
Rent of power and heat	11,889	0.1
Mill supplies	345,613	2.9
All other materials	1,361,235	11.4
Freight	1,216,024	10.2

¹ The report for the Twelfth Census is for the calendar year 1899.

Unfortunately, the cost of materials at the census of 1890 was not itemized so as to be comparable with these statistics. The cost given in Table 10 represents more nearly the actual cost of materials in this manufacture

than in the similar table under brick and tile, since less of the cost of component materials is included in wages paid. It may be assumed that practically all the materials were purchased by the manufacturers. Most of the operators of sewer-pipe plants, however, mined their own clay. Fuel was the largest item, as in the brick and tile manufacture, but it comprised only 32.4 per cent of the total, as against 79.7 per cent in brick and tile.

Table 11 shows in a condensed form the kinds and value of the pottery, terra cotta, and fire-clay products, 1900, together with the percentage which each product is of the total, and also the percentage it is of the total value of all clay products.

TABLE 11.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS: KIND AND VALUE OF PRODUCTS, WITH PER CENT OF TOTAL VALUE, 1900.¹

	Value.	Per cent of total.	Per cent of total value of all clay products. ²
Aggregate value	\$44,263,386	100.0	46.3
Pottery products:			
Total value	17,222,040	38.9	18.0
Red earthenware	762,260	1.7	0.8
Stoneware	1,070,710	4.4	2.0
Yellow and Rockingham ware	159,553	0.4	0.2
C. C. or cream-colored ware	1,540,488	3.5	1.6
White granite ware	1,787,101	4.0	1.9
Semivitreous porcelain ware	3,048,762	6.9	3.2
China (porcelain)	1,255,978	2.8	1.3
Bone china, Delft, and Belleek ware	42,000	0.1	(³)
Sanitary ware	1,850,225	4.2	1.9
Solid porcelain bath tubs, laundry tubs, etc	861,652	0.8	0.4
Porcelain electrical supplies	470,355	1.1	0.5
Porcelain doorknobs	78,333	0.2	0.1
Porcelain hardware trimmings	48,523	0.1	0.1
Art pottery and porcelain	629,402	1.4	0.6
All other pottery products	3,216,693	7.3	3.4
Terra cotta, fire, and other clay products	26,420,354	59.7	27.7
All other products	620,992	1.4	0.6

¹ The report for the Twelfth Census is for the calendar year 1899.

² Total value of all clay products, \$95,533,862.

³ Less than one-tenth of 1 per cent.

The value of pottery, terra cotta, and fire-clay products in 1899 was 46.3 per cent of the total value of all clay products, terra cotta, fire and other clay products leading with 27.7 per cent, and pottery products constituting 18 per cent. In their own subdivision terra cotta, fire and other clay products led, with 59.7 per cent of the total, pottery products being second, with 38.9 per cent.

Table 12 is a comparative summary of the pottery, terra cotta, and fire-clay manufacture, 1890 and 1900, at the two great pottery centers of the United States, East Liverpool, Ohio, and Trenton, N. J.

TABLE 12.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS: COMPARATIVE SUMMARY, TRENTON, N. J., AND EAST LIVERPOOL, OHIO, 1890 AND 1900.

	TRENTON.		EAST LIVERPOOL.	
	1900 ¹	1890	1900 ¹	1890
Number of establishments.....	29	32	30	23
Capital:				
Total.....	\$7,096,775	\$4,875,507	\$4,292,845	\$2,127,281
Value of plants.....	\$4,928,952	\$2,728,918	\$2,281,164	\$1,219,543
Cash and sundries.....	\$2,167,823	\$2,146,594	\$2,011,681	\$907,738
Proprietors and firm members.....	34		17	
Salaries of officials, clerks, etc.:				
Number.....	198	2160	251	293
Salaries.....	\$260,011	\$203,689	\$265,107	\$89,844
Wage-earners, including piece-workers, and total wages:				
Average number.....	4,289	3,935	3,908	2,062
Wages.....	\$2,343,754	\$2,144,032	\$1,835,110	\$977,069
Miscellaneous expenses.....	\$385,759	\$494,354	\$187,839	\$157,421
Materials used:				
Total cost.....	\$1,196,291	\$1,198,090	\$1,163,982	\$969,357
Clay.....	\$292,500	\$285,262	\$218,786	\$171,954
Fuel.....	\$287,108	\$261,580	\$209,213	\$130,448
Miscellaneous.....	\$487,914	\$474,874	\$681,993	\$273,912
Packing materials.....	\$128,769	\$176,374	\$158,990	\$98,043
Products:				
Total value.....	\$4,785,142	\$4,631,202	\$4,105,200	\$2,137,063
Yellow and Rockingham ware.....			\$98,034	
C. C. or cream-colored ware.....	\$751,444		\$721,219	
White granite ware.....	\$442,354		\$970,319	
Semivitreous porcelain ware.....				
China (porcelain).....	\$371,550		\$1,838,126	
Bone china, Delft, and Belleek ware.....	\$494,870		\$197,144	
Sanitary ware.....	\$42,000			
Solid porcelain bath tubs, laundry tubs, etc.....	\$1,692,359			
Porcelain electrical supplies.....	\$249,978			
Porcelain doorknobs.....	\$154,807		\$142,447	
Porcelain hardware trimmings.....	\$12,000		\$46,333	
Art pottery and porcelain.....	\$32,500			
All other pottery products.....	\$125,500			
Terra cotta, fire, and other clay products.....	\$328,399		\$51,211	
All other products.....	\$83,160		\$38,479	
Machinery and kilns:	\$4,217		\$1,888	
Pottery—				
Disintegrators.....	60		77	
Agitators.....	70		73	
Slip pumps.....	69		65	
Lawnns.....	48		44	
Clay presses—				
Iron.....	26		65	
Wood.....	39		3	
Pug mills—				
Regular.....	45		36	
Sagger.....	28		31	
Wad mills.....	31		32	
Jiggers.....	160		221	
All other machines.....	562		191	
Kilns—				
Up-draft.....	152		169	
Down-draft.....	38		10	
Muffle.....				
Large.....	24			
Decorating.....	56		73	
All other kilns.....	4		2	
Terra cotta, tile, and brick:				
Clay-grinding machines—				
Disintegrators.....	4			
Dry pans.....	3		3	
All other.....	2			
Clay-tempering machines—				
Pug mills.....	5		1	
Wet pans.....	7		2	
Molding machines—				
Stiff mud.....			1	
Dry presses.....	12			
Shape brick power presses.....	2			
Hand presses.....	6			
Sewer-pipe presses.....			2	
Kilns—				
Down-draft—				
Round.....	11		17	
Dryers.....	2		2	
Idle machines.....	21			

¹The report for the Twelfth Census is for the calendar year 1899.
²Includes proprietors and firm members, with their salaries. Number only reported in 1900.

The table shows that of the total pottery product, valued at \$17,222,040 (see Table 11), these two centers produced \$8,562,598, or 49.7 per cent. In regard to the number of establishments at Trenton, it should be stated that in one instance a concern reported as one establishment is composed of 5 plants. These, if reported separately, would have made the number of establishments 33, which would make an increase of 1 over the number returned in 1890. Owing to the difference in the classification of the products at the two censuses, it is impossible to make a comparison of the details of production in these cities for 1890 and 1900, but the total values are given.

Table 13 shows the earthenware, china, brick, and tile imported and entered for consumption in the United States from 1867 to 1900, inclusive, as compiled from the reports of the Bureau of Statistics of the Treasury Department.

TABLE 13.—VALUE OF EARTHENWARE, CHINA, BRICK, AND TILE IMPORTED AND ENTERED FOR CONSUMPTION IN THE UNITED STATES, 1867 TO 1900, INCLUSIVE.

YEAR ENDING—	Brown earthen and common stone-ware.	China and porcelain not decorated.	China and decorated porcelain.	Other earthen, stone, or crockery ware, glazed, etc.	Brick, fire brick, and tile.	Total.
June 30—						
1867.....	\$48,618	\$418,493	\$439,824	\$4,280,924		\$5,187,859
1868.....	47,208	309,960	403,555	3,244,958		4,005,712
1869.....	34,260	400,894	555,425	3,468,970		4,459,549
1870.....	47,457	420,442	580,805	3,461,524		4,490,228
1871.....	96,695	391,374	571,032	3,573,254		4,622,355
1872.....	127,346	470,749	814,134	3,896,664		5,308,893
1873.....	115,253	479,617	807,206	4,289,868		5,751,944
1874.....	70,544	397,730	876,656	3,686,794		4,881,724
1875.....	68,501	436,883	654,965	3,280,867		4,441,216
1876.....	36,744	409,539	718,156	2,948,517		4,112,956
1877.....	30,403	326,956	668,514	2,746,186		3,772,059
1878.....	18,714	389,133	657,485	3,031,393		4,096,725
1879.....	19,363	296,591	813,850	2,914,567		4,044,376
1880.....	31,504	234,371	1,188,847	3,945,666		5,400,388
1881.....	27,586	321,259	1,621,112	4,413,369		6,383,326
1882.....	36,023	316,811	2,075,708	4,438,237		6,866,779
1883.....	43,864	368,943	2,587,545	5,685,709		6,686,061
1884.....	50,172	382,499	2,664,231	(¹)	\$666,595	4,381,497
1885.....	44,701	823,334	2,334,718	(¹)	963,422	4,666,175
December 31—						
1886.....	37,320	865,446	3,350,145		951,293	5,204,704
1887.....	43,079	967,694	3,838,509		1,008,360	5,907,642
1888.....	55,568	1,054,854	4,207,598		386,314	6,204,324
1889.....	48,324	1,148,026	4,580,321		788,391	6,565,062
1890.....	56,730	974,627	3,562,851		563,568	5,157,776
1891.....	99,983	1,921,643	6,238,088		353,736	8,669,450
1892.....	63,003	2,022,814	6,555,172		380,520	9,021,509
1893.....	57,017	1,732,481	6,248,255		338,143	8,375,896
1894.....	47,114	1,550,950	5,392,648		189,631	7,180,343
1895.....	61,424	2,117,425	8,055,473		211,473	10,446,796
1896.....	41,585	1,511,542	7,729,942		247,455	9,530,524
1897.....	232,227	1,406,019	7,057,261		146,668	8,642,175
1898.....	254,672	1,002,729	5,905,209		117,324	7,079,934
1899.....	240,164	1,125,892	6,740,884		134,691	8,041,631
1900.....	265,214	1,059,152	7,617,756		169,951	8,912,073

¹Not separately classified after 1883. ²Including Rockingham ware.

Table 14 shows the exports of clay goods from 1895 to 1900. These figures, like those of imports, are compiled from the reports of the Bureau of Statistics of the Treasury Department.

TABLE 14.—EXPORTS OF CLAY WARES FROM THE UNITED STATES, FROM 1895 TO 1900, INCLUSIVE.

YEAR.	BRICK.				POTTERY.			Grand total (value).
	Building.		Fire (value).	Total value.	Earthen and stone ware (value).	China (value).	Total value.	
	Quantity.	Value.						
Decem-ber 31—	Thou-sands.							
1895...	4,757	\$34,732	\$88,729	\$123,461	\$114,425	\$24,872	\$139,297	\$262,758
1896...	5,253	32,759	102,636	135,395	144,641	24,702	169,343	304,738
1897...	4,696	30,833	110,626	141,009	177,320	50,233	207,603	348,612
1898...	4,703	32,317	140,632	178,949	212,769	39,052	251,821	430,770
1899...	9,372	77,783	214,375	292,158	467,325	43,807	511,732	803,890
1900...	12,526	128,800	594,237	723,037	489,942	68,352	558,794	1,281,831

Table 15 is a comparative summary, 1890 and 1900, by states and territories, for the manufacture of clay products.

Table 16 is a comparative summary, 1890 and 1900,

by states and territories, of the quantity and value of clay products. It will be observed that the total value of the pottery as here presented, \$17,197,415, is slightly less than that shown in Table 18, \$18,222,040. This is due to the necessity of including the statistics of pottery in Florida, Idaho, Nebraska, and New Hampshire among "all other products" of the brick, tile, and terra cotta part of Table 16, to avoid disclosing individual returns. Table 16 does not give the schedule division of products between brick and tile, and pottery, terra cotta, and fire-clay products, but between clay manufactures for building and other purposes and manufactures of potteries only.

Table 17 is a summary of the manufacture of brick and tile, 1900, by states and territories.

Table 18 is a summary of the manufacture of pottery, terra cotta, and fire-clay products, 1900, by states and territories.

MANUFACTURES.

TABLE 15.—CLAY PRODUCTS: COMPARATIVE SUMMARY

STATES AND TERRITORIES.	Year.	Number of establishments.	Capital.	Proprietors and firm members.	SALARIED OFFICIALS, CLERKS, ETC.	
					Number.	Salaries.
1 United States.....	{ 1900 1890	6, 423 6, 535	\$148, 038, 323 108, 705, 670	7, 596 (²)	5, 208 6, 291	\$5, 036, 195 4, 254, 943
2 Alabama.....	{ 1900 1890	93 70	681, 334 742, 376	121	59 54	33, 139 33, 139
3 Arizona.....	{ 1900 1890	19 3	56, 945 1, 210	24	3	2, 700
4 Arkansas.....	{ 1900 1890	65 57	388, 319 318, 262	76	27 49	22, 641 30, 440
5 California.....	{ 1900 1890	74 64	2, 512, 164 2, 527, 673	76	86 86	101, 330 95, 063
6 Colorado.....	{ 1900 1890	75 89	1, 381, 710 1, 980, 422	83	60 125	78, 062 125, 237
7 Connecticut.....	{ 1900 1890	45 43	1, 862, 133 1, 184, 155	42	76 69	33, 356 62, 023
8 Delaware.....	{ 1900 1890	25 13	233, 637 250, 982	27	9 17	8, 860 15, 086
9 District of Columbia.....	{ 1900 1890	17 18	972, 040 946, 333	20	22 28	22, 604 26, 259
10 Florida.....	{ 1900 1890	18 12	200, 885 139, 770	20	11 22	9, 550 11, 239
11 Georgia.....	{ 1900 1890	91 78	1, 311, 889 1, 179, 532	100	80 92	63, 545 66, 960
12 Idaho.....	{ 1900 1890	24 5	51, 882 11, 405	29	3	510
13 Illinois.....	{ 1900 1890	619 644	12, 710, 709 10, 670, 707	729	361 613	418, 669 396, 584
14 Indiana.....	{ 1900 1890	607 784	6, 030, 738 3, 447, 764	731	208 570	163, 933 212, 450
15 Indian Territory.....	{ 1900 1890	13	26, 077	22	1	720
16 Iowa.....	{ 1900 1890	356 289	3, 437, 613 2, 114, 863	458	107 233	78, 427 101, 982
17 Kansas.....	{ 1900 1890	60 93	774, 410 809, 882	70	50 60	30, 334 31, 215
18 Kentucky.....	{ 1900 1890	100 109	1, 504, 006 1, 077, 601	108	83 123	71, 259 70, 893
19 Louisiana.....	{ 1900 1890	61 27	633, 003 357, 003	70	44 37	26, 635 25, 851
20 Maine.....	{ 1900 1890	74 127	623, 335 820, 507	82	33 81	18, 823 40, 631
21 Maryland.....	{ 1900 1890	63 75	5, 074, 263 3, 058, 409	65	104 91	96, 612 71, 621
22 Massachusetts.....	{ 1900 1890	110 139	3, 946, 239 3, 825, 818	134	126 178	104, 565 137, 302
23 Michigan.....	{ 1900 1890	186 196	1, 777, 532 1, 950, 401	225	68 149	43, 093 63, 202
24 Minnesota.....	{ 1900 1890	112 128	1, 579, 698 1, 827, 431	130	49 164	46, 940 71, 886
25 Mississippi.....	{ 1900 1890	73 36	506, 214 246, 885	98	41 36	21, 822 18, 634
26 Missouri.....	{ 1900 1890	256 277	9, 003, 185 6, 099, 308	237	220 311	274, 714 270, 330
27 Montana.....	{ 1900 1890	28 11	451, 709 173, 650	30	16 8	12, 923 6, 440
28 Nebraska.....	{ 1900 1890	107 155	1, 276, 933 2, 791, 774	135	40 134	26, 446 84, 464
29 Nevada.....	{ 1900 1890	7	19, 905	10		
30 New Hampshire.....	{ 1900 1890	57 66	702, 713 597, 073	72	36 33	20, 746 15, 914
31 New Jersey.....	{ 1900 1890	157 155	18, 932, 379 10, 569, 054	143	548 332	717, 407 330, 743

¹The report for the Twelfth Census is for the calendar year 1899.²Included with salaried officials, clerks, etc.³Includes 1 establishment in Rhode Island.⁴Includes only brick and tile; clay and pottery products included in "all other states."

CLAY PRODUCTS.

BY STATES AND TERRITORIES: 1890 AND 1900.¹

AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.								Miscellaneous expenses.	Cost of materials used.	Value of products.	
Total.		Men, 16 years and over.		Women, 16 years and over.		Children, under 16 years.					
Average number.	Total wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.				
105,698 123,166	\$80,575,070 88,578,389	98,127 115,600	\$87,957,248 87,426,873	4,557 2,285	\$1,142,579 536,269	3,009 5,321	\$475,243 615,247	\$6,845,040 7,111,776	\$22,921,384 18,257,998	\$95,533,862 89,827,785	1
1,349 1,687	323,370 332,937	1,201 1,416	304,018 312,843	13	844	148 158	19,352 19,250	42,868 54,197	202,455 164,557	883,129 802,331	2
89 31	46,980 2,600	83 31	45,752 2,600	1	70	5	1,158	9,950 37	15,202 700	101,758 4,800	3
494 786	127,252 159,568	474 651	124,582 150,107	2	470	20 83	2,670 8,991	8,634 84,577	63,587 107,545	336,899 520,734	4
1,111 1,754	578,994 794,276	1,097 1,749	575,552 793,480	2 1	504 380	12 4	2,938 486	112,302 236,482	427,118 621,470	1,585,738 2,266,914	5
812 2,250	452,949 1,061,475	806 2,188	451,304 1,049,957	1 4	350 660	5 61	1,295 10,858	60,157 124,676	247,049 395,100	1,071,388 2,238,618	6
1,167 1,180	486,488 398,428	1,139 1,186	480,363 386,748	19 31	4,396 9,394	9 18	1,729 2,286	74,964 53,054	218,635 168,523	1,074,202 863,040	7
215 410	70,063 128,050	211 389	69,888 125,804	1	100	3 21	625 2,246	7,772 19,923	22,439 30,341	167,692 268,534	8
546 1,270	204,077 457,291	546 1,191	204,077 441,291	1	175	79	16,000	43,332 69,334	90,954 288,310	481,145 961,537	9
261 215	67,499 49,858	249 192	65,900 46,073	1	175	12 22	1,599 3,110	5,954 12,853	34,018 19,805	137,953 119,200	10
1,986 2,252	414,092 496,923	1,912 2,183	407,255 491,671	3 4	575 504	71 65	6,262 4,748	60,274 74,319	806,289 285,099	1,259,577 1,412,792	11
44 35	18,144 4,200	44 35	18,144 4,200	1	102	1	1,102	1,214 1,102	8,805 1,690	46,609 9,800	12
7,229 10,596	2,971,907 3,574,177	7,034 10,128	2,938,064 3,516,606	37 51	9,250 7,901	158 419	24,598 49,070	499,355 718,661	1,601,742 1,495,503	7,224,915 7,956,082	13
4,859 5,926	1,726,782 1,269,834	4,635 5,650	1,667,556 1,240,804	200 69	38,703 11,231	124 207	20,223 17,799	241,275 193,682	864,642 514,651	4,222,529 3,142,454	14
45	17,960	43	17,658	2	302	2	802	2,281	6,419	35,075	15
2,220 2,788	862,159 724,999	2,175 2,700	854,392 716,380	1 8	360 2,363	44 30	7,407 6,256	140,459 108,934	517,580 332,393	2,224,920 1,775,165	16
927 1,256	325,850 293,321	914 1,184	324,114 287,260	4	420	18 68	1,786 5,641	58,278 47,286	162,118 133,397	753,411 690,574	17
1,759 2,035	484,800 503,833	1,675 1,889	473,326 490,183	10 15	1,729 2,270	74 131	9,745 11,380	64,875 93,399	326,262 284,075	1,355,094 1,206,181	18
1,064 554	267,021 140,967	961 530	254,631 138,517	2 4	480 700	101 20	11,910 1,750	47,989 20,659	107,998 65,272	558,465 336,495	19
547 1,164	232,330 321,274	546 1,120	232,250 308,674	39	12,258	1 5	80 342	61,719 57,110	163,742 220,092	662,235 804,074	20
2,533 3,040	837,798 878,651	2,326 2,854	778,876 846,872	80 68	31,287 15,346	177 118	27,635 10,933	92,946 288,516	352,299 333,945	1,679,166 1,985,828	21
2,013 3,593	884,452 1,228,185	1,952 3,537	867,797 1,214,855	54 49	15,064 12,380	7 7	1,591 950	166,938 198,680	538,643 712,942	2,181,510 2,819,760	22
1,592 2,675	530,930 572,168	1,542 2,618	523,054 566,891	19 8	3,277 1,433	31 49	4,599 4,844	65,844 89,853	275,327 273,715	1,280,590 1,407,957	23
1,276 2,238	481,493 520,218	1,232 2,139	473,632 511,926	10 9	2,181 923	34 90	5,680 7,369	50,775 99,058	339,662 313,468	1,217,743 1,331,339	24
929 706	207,463 140,419	372 656	201,605 136,712	57 50	26,337 3,707	57 50	5,858 3,707	26,337 11,564	103,145 73,100	540,725 339,939	25
4,047 5,618	1,514,674 1,990,016	3,891 5,228	1,492,566 1,936,526	4	430	156 384	22,108 53,060	362,296 417,649	842,077 1,028,407	3,650,400 4,782,619	26
226 244	150,892 97,902	223 242	149,942 97,802	1	350	2	600 100	15,165 9,335	91,606 58,088	314,340 238,610	27
857 2,686	328,244 760,386	339 2,437	324,956 739,787	4	497	18 145	3,288 20,102	41,484 138,257	203,865 484,918	841,305 2,178,632	28
14	9,885	14	9,885	1	85	1	85	541	3,499	17,850	29
632 1,601	241,915 345,383	622 1,490	239,412 341,753	2 10	399 3,540	8 1	2,104 90	26,964 34,662	158,234 204,330	570,237 835,156	30
10,487 9,094	4,677,059 3,739,437	9,327 7,970	4,348,418 3,546,574	929 799	287,089 193,590	231 325	41,552 44,273	972,530 714,485	2,703,696 1,877,488	10,786,678 7,991,611	31

¹ Included in "all other states."

² None reported in 1890.

MANUFACTURES.

TABLE 15.—CLAY PRODUCTS: COMPARATIVE SUMMARY

STATES AND TERRITORIES.	Year.	Number of establishments.	Capital.	Proprietors and firm members.	SALARIED OFFICIALS, CLERKS, ETC.	
					Number.	Salaries.
32 New Mexico.....	{ 1900 1890 ²	11	\$55,395	18	4	\$3,900
33 New York.....	{ 1900 1890	269 331	12,843,327 11,196,350	301	359 396	367,499 324,199
34 North Carolina.....	{ 1900 1890	178 71	527,925 266,790	240	43 48	15,649 19,206
35 North Dakota.....	{ 1900 1890	18 6	218,950 30,095	22	5 2	3,500 950
36 Ohio.....	{ 1900 1890	934 1,000	22,907,596 12,139,977	1,078	1,026 911	955,107 586,566
37 Oklahoma.....	{ 1900 1890	36 3	109,825 2,990	42	5 2	3,845 497
38 Oregon.....	{ 1900 1890 ¹	51 47	407,824 656,151	61	21 38	18,680 38,069
39 Pennsylvania.....	{ 1900 1890	528 576	21,815,600 15,607,046	679	737 588	698,579 480,527
40 South Carolina.....	{ 1900 1890	86 44	366,711 244,407	119	43 28	20,446 13,055
41 South Dakota.....	{ 1900 1890	11 11	64,125 103,605	19	14	5,534
42 Tennessee.....	{ 1900 1890	109 88	1,062,993 1,092,100	136	49 85	42,775 63,882
43 Texas.....	{ 1900 1890	171 143	1,496,666 1,189,561	192	71 101	58,891 64,008
44 Utah.....	{ 1900 1890 ¹	56 40	209,407 279,147	85	13 30	8,705 16,101
45 Vermont.....	{ 1900 1890	16 20	130,298 139,915	15	16 11	15,539 4,267
46 Virginia.....	{ 1900 1890	85 98	1,840,713 1,560,787	96	66 90	59,035 51,392
47 Washington.....	{ 1900 1890	40 90	806,885 1,211,158	87	42 72	45,429 47,592
48 West Virginia.....	{ 1900 1890	56 35	2,219,842 289,628	61	79 23	70,014 14,034
49 Wisconsin.....	{ 1900 1890	172 153	2,233,853 2,573,733	174	61 134	48,521 84,401
50 Wyoming.....	{ 1900 1890	4 7	6,775 28,970	4	2	390
51 All other states and territories.....	{ 1900 1890 ^a	11	422,960		23	13,116

¹ Includes only brick and tile; clay and pottery products included in "all other states."² None reported in 1890.

CLAY PRODUCTS.

BY STATES AND TERRITORIES: 1890 AND 1900¹—Continued.

AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.								Miscellaneous expenses.	Cost of materials used.	Value of products.	
Total.		Men, 16 years and over.		Women, 16 years and over.		Children, under 16 years.					
Average number.	Total wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.				
122	\$48,586	121	\$48,486			1	\$100	\$1,553	\$22,878	\$108,090	82
9,007	8,637,462	8,570	3,529,338	342	\$89,154	95	18,970	895,878	1,631,003	8,078,769	83
12,166	4,012,376	11,077	3,911,479	270	73,737	219	27,160	1,112,278	1,658,608	8,806,273	
1,546	292,928	1,442	283,435	2	300	102	9,193	25,964	173,507	725,016	34
1,023	135,625	929	129,732	1	100	93	5,793	11,997	66,663	346,270	
121	56,977	114	55,377	3	600	4	1,000	3,865	34,734	158,874	35
78	17,545	78	17,545					1,888	6,595	45,775	
17,223	6,967,817	14,861	6,401,288	2,154	528,863	208	37,666	1,029,550	4,211,061	16,480,812	36
13,263	4,375,109	12,133	4,168,914	614	148,974	516	67,221	828,241	2,336,160	10,800,938	
173	62,902	170	62,263			8	639	3,459	24,420	149,712	37
14	6,187	14	6,187					890	1,491	11,500	
277	124,873	267	122,415	1	276	9	2,182	17,876	60,278	317,978	38
663	139,704	651	198,681			12	1,023	15,287	65,230	461,648	
15,605	5,633,645	14,553	5,454,026	411	60,443	641	119,176	988,196	3,589,924	14,081,844	39
14,695	5,029,600	13,889	4,862,704	123	24,972	1,183	151,984	792,260	2,131,164	11,143,668	
1,191	251,106	1,130	245,094	5	563	56	5,449	26,324	136,886	596,693	40
793	118,348	728	114,045			65	4,903	10,769	48,815	279,889	
48	19,687	48	19,687					1,378	12,625	46,150	41
205	44,413	205	44,413					3,678	17,623	134,650	
1,452	384,752	1,366	374,583			86	10,169	111,544	240,063	944,610	42
2,079	613,374	1,877	596,786	8	1,488	194	16,105	57,338	195,882	1,277,397	
1,859	496,996	1,811	490,829			43	6,167	59,808	278,893	1,212,266	43
2,072	553,980	2,011	546,377	1	150	60	7,463	56,722	267,143	1,311,270	
285	100,151	263	96,800			22	3,851	11,146	88,862	215,049	44
728	216,357	662	208,542			66	7,815	27,601	66,551	421,658	
122	44,342	119	44,442			3	400	8,487	29,137	131,525	45
215	44,208	209	43,758			6	450	5,939	24,535	119,039	
1,518	427,588	1,482	416,692	2	567	84	10,329	66,899	229,108	1,069,399	46
2,390	563,738	2,245	555,223			145	8,515	47,619	217,502	1,361,433	
455	245,762	448	244,286	1	600	6	876	36,938	110,598	583,857	47
1,833	637,274	1,812	635,017	8	1,086	18	1,171	61,019	233,510	1,529,479	
1,819	684,820	1,498	610,536	263	64,949	58	9,835	145,364	316,103	1,541,239	48
448	130,575	406	125,598	2	500	40	4,477	5,795	69,949	304,865	
1,479	545,754	1,418	534,552	1	100	60	11,102	95,638	781,574	1,810,206	49
2,835	665,214	2,741	658,500	9	1,378	85	5,336	127,137	409,132	1,785,442	
11	4,900	11	4,900					216	1,033	8,450	50
29	11,020	29	11,020					351	3,723	26,900	
290	122,456	276	120,006	2	750	12	1,700	17,769	68,298	315,300	51

¹ Includes establishments distributed as follows: Clay and pottery products—Delaware, 2; Florida, 1; Nebraska, 1; Oregon, 1; Rhode Island, 2; Utah, 1. Brick and tile—Indian Territory, 1; Rhode Island, 2.

MANUFACTURES.

TABLE 16.—CLAY PRODUCTS: COMPARATIVE SUMMARY, KINDS, QUANTITY, AND

STATES AND TERRITORIES.	Year.	Aggregate value.	BRICK, TILE, AND TERRA COTTA.								
			Total value.	Common brick.		Pressed brick.		Fancy colored brick.		Vitrified brick and blocks.	
				Number of 1,000.	Value.	Number of 1,000.	Value.	Number of 1,000.	Value.	Number of 1,000.	Value.
1 United States.....	{ 1900 1890	\$95,533,862 89,827,785	\$78,386,447 77,488,493	7,654,528 8,045,282	\$39,674,749 48,810,271	282,542 440,977	\$2,537,912 5,973,902	149,901 11,631	\$2,082,000 187,920	590,720 98,345	\$4,828,456 982,440
2 Alabama.....	{ 1900 1890	883,129 802,331	857,287 779,050	107,495 97,994	600,659 685,080	4,045 1,520	24,610 17,700	800	3,750	11,075	100,600
3 Arizona.....	{ 1900 1890	101,758 4,300	101,758 4,300	15,655 600	101,638 4,300						
4 Arkansas.....	{ 1900 1890	386,899 520,734	316,828 486,465	43,443 52,177	277,904 358,810	884 755	8,690 7,000			1,300 11,700	12,700 99,000
5 California.....	{ 1900 1890	1,585,788 2,266,914	1,553,925 2,254,654	129,492 161,603	800,010 1,030,762	2,776 8,390	31,213 230,292	826 300	28,225 10,500	10	100
6 Colorado.....	{ 1900 1890	1,071,388 2,238,618	1,056,338 2,218,331	75,603 243,683	422,524 1,716,849	9,824 19,454	100,067 265,665	1,997	36,546	4,760	48,200
7 Connecticut ¹	{ 1900 1890	1,074,202 863,040	992,452 696,340	160,665 90,150	751,239 649,950	4,800 25	42,000 500	10 35	280 500	5,000	50,000
8 Delaware.....	{ 1900 1890	167,692 268,534	167,692 268,534	18,310 30,842	137,526 230,278	2,212 1,500	23,566 30,000				
9 District of Columbia.....	{ 1900 1890	481,145 961,587	462,375 949,087	45,657 90,430	358,232 643,350	434 11,050	5,310 198,600	20 126	600 882		
10 Florida.....	{ 1900 1890	137,953 119,260	137,953 119,260	25,974 15,965	131,268 96,250			60	600		
11 Georgia.....	{ 1900 1890	1,259,577 1,412,792	1,234,122 1,370,722	201,551 191,020	966,855 1,098,962	8,000 5,200	70,600 97,850	500	7,500	600	3,750
12 Idaho.....	{ 1900 1890	46,609 9,800	46,609 9,800	6,155 1,012	43,209 9,800						
13 Illinois.....	{ 1900 1890	7,224,915 7,956,082	6,461,910 7,541,901	656,202 711,884	3,197,987 4,015,945	14,304 40,235	119,419 592,269	12,597 278	132,535 5,000	88,047 18,525	700,524 153,400
14 Indiana.....	{ 1900 1890	4,222,529 3,142,454	3,376,495 3,073,984	863,252 318,429	1,721,766 1,690,611	11,317 5,125	109,978 57,627	3,000 1,000	30,000 5,000	28,120 500	258,471 6,000
15 Indian Territory.....	{ 1900 1890	35,075	35,075	5,680	35,075						
16 Iowa.....	{ 1900 1890	2,224,920 1,775,165	2,193,190 1,623,731	218,931 174,527	1,320,472 1,129,079	11,024 4,292	91,611 43,537	6,256 1,530	69,279 10,830	29,555 6,300	225,011 64,000
17 Kansas.....	{ 1900 1890	753,411 690,574	725,431 670,969	76,605 88,234	393,570 525,029	4,422 6,260	36,853 69,827	30	210	40,635 4,600	276,384 55,600
18 Kentucky.....	{ 1900 1890	1,355,094 1,206,181	1,250,969 1,136,381	103,454 130,896	543,681 805,170	2,505 15,434	20,275 126,211			5,919	60,398
19 Louisiana.....	{ 1900 1890	553,405 336,495	540,825 303,925	101,837 41,325	514,313 282,625	1,730 600	14,775 8,500				
20 Maine.....	{ 1900 1890	662,235 304,074	655,074 753,774	72,649 87,065	399,110 498,731	5,588 780	39,165 9,350	600	25,000	87	802
21 Maryland.....	{ 1900 1890	1,679,166 1,935,828	1,317,665 1,637,353	111,469 141,076	681,997 1,069,814	11,867 7,706	86,460 148,617	2,468 100	71,458 20,000	50	700
22 Massachusetts.....	{ 1900 1890	2,181,510 2,319,760	1,887,677 2,485,359	230,437 233,231	1,256,767 1,837,211	2,250 10,670	31,200 199,950	1,460	48,080		
23 Michigan.....	{ 1900 1890	1,280,590 1,407,957	1,250,949 1,376,257	199,764 202,557	931,311 989,793	3,930 3,165	53,760 28,860	340	5,000	2,400	28,800
24 Minnesota.....	{ 1900 1890	1,217,743 1,331,339	1,011,443 1,193,789	145,226 203,980	753,825 1,039,468	1,935 1,375	15,050 21,325	2,000 1,800	26,000 36,000		
25 Mississippi.....	{ 1900 1890	540,725 339,939	522,325 295,939	88,203 41,629	508,135 284,642	1,195 592	12,775 3,697				
26 Missouri.....	{ 1900 1890	3,650,400 4,732,619	3,572,223 4,602,230	250,335 338,034	1,331,517 1,978,447	21,524 98,164	177,996 928,436	8,453 30	103,041 6,840	22,594 6,000	188,787 60,000
27 Montana.....	{ 1900 1890	314,340 238,610	312,390 238,610	28,725 27,115	183,339 208,910	196 650	2,440 5,200	2	37	85	1,445
28 Nebraska.....	{ 1900 1890	841,305 2,173,632	841,305 2,173,632	118,952 227,210	779,236 1,610,097	1,588 13,704	23,653 201,690			2,110 29,000	15,000 325,000
29 Nevada.....	{ 1900 1890	17,850	17,850	2,085	17,440						
30 New Hampshire.....	{ 1900 1890	570,237 385,156	570,237 797,156	98,900 124,602	505,951 725,686	2,138 280	21,301 3,650				
31 New Jersey.....	{ 1900 1890	10,736,673 7,991,611	5,716,107 3,197,710	394,654 371,938	1,809,306 1,866,507	9,957 23,477	137,434 369,639	27,868 3,500	472,385 40,875	210	2,687

¹The report for the Twelfth Census is for the calendar year 1899.

²Includes the pottery products of Florida, Idaho, Nebraska, and New Hampshire, to avoid disclosing the operations of individual establishments.

CLAY PRODUCTS.

VALUE OF PRODUCTS, BY STATES AND TERRITORIES: 1890 AND 1900.¹

BRICK, TILE, AND TERRA COTTA--continued.														
Electric- al con- duits.	Sewer pipe.	Drain- tile.	Flue linings.	Stove linings.	Furnace fittings.	Gas retorts.	Glass- melting pots.	Fire brick.	Roofing, floor, and encaustic tile.	Hollow brick, fire- proofing, and terra- cotta lumber.	Chimney tops.	Architec- tural terra cotta.	All other brick, tile, and terra- cotta products.	}
\$685,273 53,500	\$4,560,334 5,394,921	\$3,662,184 5,009,804	\$310,989 68,184	\$416,235 151,023	\$1,043,085 161,469	\$196,567 24,408	\$407,141 312,343	\$8,636,562 6,318,770	\$1,276,300 795,958	\$1,665,031 402,750	\$242,289 101,208	\$2,027,532 1,431,228	² \$4,088,808 1,308,394	} 1
	10,000	325			7,068	450		114,050 161,270			25		5,750 5,000	} 2
													120	} 3
	40	9,234 5,025						8,100 20,340	1,200				200 50	} 4
	479,537 684,950	9,298	12,620 6,800	1,350	6,516		1,000	28,798 69,750	3,400	7,100	19,800 6,100	76,000 134,500	48,958 107,600	} 5
	60,218 62,765	5,397	2,503			12,800 107,390	2,640	162,688 52,412		2,514	250		199,046 13,350	} 6
	70,540	7,750	15,000	1,200	18,400			23,000 21,600		15,000	2,000	200	76,383 43,300	} 7
		5,700 8,000											900 256	} 8
21,562 20,000	69,495 80,164	475	4,301					91			400		2,000 6,000	} 9
	500	1,921 450										50	3,614 560	} 10
	100,612 108,630	1,895 1,000	1,500	10	2,500			24,400 25,730		4,000	1,750	44,200 40,000	4,550 3,550	} 11
		400											3,000	} 12
	229,040 828,330	1,025,469 1,881,403	30,390		2,504	92 1,008	260	132,759 222,595	130,085 310,020	198,380 60,000	185 3,600	422,009 375,000	140,291 66,176	} 13
76,400	161,935 22,550	833,347 1,007,601	5,175			2,000	48,900	72,350 39,346	328,041 114,951	62,575 60,000	5,100	22,500 55,000	137,957 15,298	} 14
														} 15
	47,719 62,645	850,258 277,853						300 10,595	1,051	4,700	50 200	50	81,457 24,191	} 16
		6,550 16,391						3,330	322				12,074 200	} 17
	104,441 55,200	36,132 33,400	4,700 7,500					334,630 45,072	3,000 58,778	1,750	1,780 2,500		140,182 3,550	} 18
		3,335			2,100 12,800								6,302	} 19
	173,455 188,914	3,538 3,575		500	17,886				18,989 3,000			100	1,629 104	} 20
	24,000 80,500	3,673 1,935		32,457 7,000		11,500		325,812 215,985	7,255 14,000		1,400 3,000	130,000	70,953 46,502	} 21
	52,000	824 17,500		143,547 23,878	46,904			22,792 165,320		70,573 40,000		52,224	214,766 147,600	} 22
	50,300 122,340	133,889 165,377	15,375 500					3,000 3,200	65,000	5,900	5,112		18,614 5,375	} 23
	153,545 28,800	11,400 2,080						695		31,000 18,000			15,623 3,421	} 24
		1,035						600					380 2,000	} 25
2,000	436,624 533,000	53,130 75,130	6,540 46,384	10,000	280,240 34,079	52,560 12,000	3,151 28,576	375,023 624,390	7,000 123,660	26,257	590 14,200	181,495 107,993	333,272 32,085	} 26
	25,000 14,000			250				72,088 10,000		1,100	50		22,041	} 27
													23,326 33,145	} 28
		1,700						2,000					410	} 29
	7,300							15,000 60,000					28,035 520	} 30
250,006	99,000 251,693	27,660 176,928	91,730	8,000	116,500	77,666	12,000	633,158 234,980	37,123 5,655	663,144	21,177	660,304 26,250	623,004 205,006	} 31

¹Includes 1 establishment in Rhode Island.

MANUFACTURES.

TABLE 16.—CLAY PRODUCTS: COMPARATIVE SUMMARY, KINDS, QUANTITY, AND

STATES AND TERRITORIES.	Year.	Aggregate value.	BRICK, TILE, AND TERRA COTTA.								
			Total value.	Common brick.		Pressed brick.		Fancy colored brick.		Vitrified brick and blocks.	
				Number of 1,000.	Value.	Number of 1,000.	Value.	Number of 1,000.	Value.	Number of 1,000.	Value.
32 New Mexico.....	{ 1900 1890	\$108,090	\$108,090	7,712	\$57,600	2,899	\$28,990	500	\$6,500	.....	.....
33 New York.....	{ 1900 1890	8,073,769 8,806,273	7,424,177 8,017,481	1,246,633 1,107,191	5,274,356 5,894,434	18,257 14,959	136,127 266,932	7,771 1,300	113,718 13,000	32,350	\$342,845
34 North Carolina.....	{ 1900 1890	725,016 346,270	705,085 333,150	126,458 52,544	639,248 298,710	2,070 1,689	14,262 15,290	5	150	785	4,220
35 North Dakota.....	{ 1900 1890	158,874 45,775	158,874 45,775	22,660 6,300	131,874 45,775	750	9,000	200	3,000	.....	.....
36 Ohio.....	{ 1900 1890	16,480,812 10,860,938	9,486,007 7,315,489	465,986 533,238	2,418,401 2,960,466	29,218 23,474	256,494 354,101	19,611 958	210,061 12,447	145,657 21,720	1,133,509 214,380
37 Oklahoma.....	{ 1900 1890	149,712 11,500	149,712 11,500	17,278 1,430	112,692 11,500	650	10,500	.....	.....	.....	.....
38 Oregon.....	{ 1900 1890	317,978 461,648	306,774 461,648	28,155 57,845	132,551 411,959	323 1,300	2,460 26,925	450	16,000	.....	.....
39 Pennsylvania.....	{ 1900 1890	14,081,844 11,143,668	12,917,327 10,381,470	780,387 805,634	4,519,324 5,547,782	50,363 50,960	461,345 923,212	38,421 40	497,655 800	89,017	702,732
40 South Carolina.....	{ 1900 1890	596,693 279,889	537,153 263,214	118,932 44,864	544,838 250,078	3,935 1,125	25,600 10,655	52 4	620 36	.....	.....
41 South Dakota.....	{ 1900 1890	46,150 134,650	46,150 134,650	6,575 16,000	46,150 110,905	.....	.....	.....	.....	.....	.....
42 Tennessee.....	{ 1900 1890	944,610 1,277,397	876,690 1,248,217	112,520 182,507	552,349 1,050,417	9,646 10,340	58,336 94,700	29	267	5,780	69,289
43 Texas.....	{ 1900 1890	1,212,266 1,311,270	1,130,759 1,280,740	178,006 151,090	939,955 1,062,830	3,816 13,810	32,941 122,660	3,470	26,880	3,206	31,530
44 Utah.....	{ 1900 1890	215,049 421,658	207,349 421,658	29,132 54,695	167,031 396,208	1,552 865	17,967 17,300	60	500	.....	.....
45 Vermont.....	{ 1900 1890	131,525 119,039	131,525 95,291	18,510 13,300	92,725 84,291	400 150	3,600 2,700	.....	.....	.....	.....
46 Virginia.....	{ 1900 1890	1,039,399 1,361,433	1,080,294 1,345,293	123,455 146,358	763,128 1,047,702	11,134 19,967	113,061 264,380	7,523	129,076	5,000	50,000
47 Washington.....	{ 1900 1890	533,857 1,529,479	570,507 1,525,909	55,444 162,494	403,378 1,293,760	565 3,409	12,210 58,410	932	19,580	937	14,260
48 West Virginia.....	{ 1900 1890	1,541,239 304,365	955,929 285,993	49,343 17,605	269,356 100,493	1,396	12,368	300	3,350	65,451	505,039
49 Wisconsin.....	{ 1900 1890	1,810,206 1,735,442	1,797,061 1,740,377	173,497 191,379	1,071,631 1,171,905	4,460 8,100	40,800 107,885	2,415	19,377	30	450
50 Wyoming.....	{ 1900 1890	8,450 25,900	8,450 25,900	915 2,750	7,300 25,900	60	1,150	.....	.....	.....	.....
51 All other states and territories, ¹	{ 1900 1890	315,300	280,300	17,300	123,000	.....	.....	.....	.....	.....	.....

¹The report for the Twelfth Census is for the calendar year 1899.

CLAY PRODUCTS.

VALUE OF PRODUCTS, BY STATES AND TERRITORIES: 1890 AND 1900¹—Continued.

BRICK, TILE, AND TERRA COTTA—continued.													
Electric- al con- duits.	Sewer pipe.	Drain- tile.	Flue linings.	Stove linings.	Furnace fittings.	Gas retorts.	Glass- melting pots.	Fire brick.	Roofing, floor, and encaustic tile.	Hollow brick, fire- proofing, and terra- cotta. lumber.	Chimney tops.	Architec- tural terra cotta.	All other brick, tile, and terra- cotta products.
		\$2,000						\$6,000					\$7,000
\$20,000	\$51,283 557,765	41,176 106,323	\$10,480	\$74,507 90,500	\$50,640	\$4,750 11,400	\$17,450	227,814 365,755	\$91,645 20,745	\$108,926 145,000	\$175,025 542	\$417,350 380,645	283,516 140,990
	88,000 1,500	8,575 4,400	1,000					3,880 13,650					1,250 4,600
								15,000					
315,305 33,500	1,680,724 1,320,500	968,488 1,084,180	83,119	7,563	155,543	33,509	136,620 78,750	976,693 1,068,920	565,094 18,700	346,090 29,800	29,472 27,987	53,690	169,327 68,068
	36,700 1,800	20,415 20,564	600					1,300 400	1,000	15,500	3,045		27,203
	204,400 485,407	26,519 249,133	10,535	106,851 500	323,475 7,200	11,400	205,210 187,567	4,921,339 2,594,883	61,036 20,650	110,210 45,250	2,266 8,910	199,100 124,650	613,880 185,526
	980	2,240 3,989						11,220 1,976					2,640 500
								3,885					
	142,999	16,695 5,880	4,497	800				28,049 19,100	150				4,209 77,176
	58,753 7,800	2,325 3,150		5,000				23,234 4,500	500	2,802	300 1,750	8,150	12,089 19,400
	8,000	475						3,250 7,750			500		9,626 400
		3,200 3,000		30,000									2,000
	5,300												
	4,909	3,860 19,417						937 350	1,300				20,232 7,240
	76,694 107,023	5,346 570	924 7,000					16,053 9,960	17,976	2,152	300 3,660	9,300	10,810 27,550
	42,350 36,000	3,656	10,000					54,400 146,000	22,632 500	78			32,150 3,000
		23,334 336,000											641,469 11,801
	73,926							23,340	14,800		120		
	152,750			2,000							350		2,200

¹Includes establishments distributed as follows: Brick and tile—Indian Territory, 1; Rhode Island, 2. Pottery—Delaware, 2; Florida, 1; Nebraska, 1; Oregon, 1; Rhode Island, 2; Utah, 1.

TABLE 16.—CLAY PRODUCTS: COMPARATIVE SUMMARY, KINDS, QUANTITY, AND VALUE OF PRODUCTS, BY STATES AND TERRITORIES: 1890 AND 1900¹—Continued.

STATES AND TERRITORIES.	Year.	POTTERY.								
		Total value.	Stoneware.	Yellow and Rockingham ware.	C. C., or cream-colored ware.	White granite ware.	Semivitreous porcelain ware.	China (porcelain).	Art pottery and porcelain.	All other pottery products.
United States.....	1900	\$17,197,415	\$1,970,710	\$159,553	\$1,540,488	\$1,787,101	\$3,048,762	\$1,255,978	\$620,402	\$3,805,421
	1890	12,339,292	2,056,493	439,553	1,226,161	1,676,579	669,107	460,334	957,168	2,483,927
Alabama.....	1900	25,842	24,062							1,180
	1890	23,281	17,167	1,576			281		1,944	2,313
Arizona.....	1900									
	1890									
Arkansas.....	1900	20,071	19,840							231
	1890	34,269	33,125							1,144
California.....	1900	31,813	4,389							27,424
	1890	12,260	2,400						200	0,600
Colorado.....	1900	16,050								16,050
	1890	20,287	15,787							4,500
Connecticut.....	1900	81,750							28,500	53,250
	1890	166,700	25,500		45,000					96,200
Delaware.....	1900									
	1890									
District of Columbia.....	1900	18,770								18,770
	1890	12,500	3,500							9,000
Florida.....	1900									
	1890									
Georgia.....	1900	25,455	22,215							3,240
	1890	42,070	21,800	1,868			14,000		4,000	402
Idaho.....	1900									
	1890									
Illinois.....	1900	763,005	572,075							190,930
	1890	414,991	224,886				18,320			171,785
Indiana.....	1900	346,084	48,648							297,336
	1890	68,470	49,850	500	5,000			1,000		12,120
Indian Territory.....	1900									
	1890									
Iowa.....	1900	29,730	22,398							7,332
	1890	146,434	132,134				10,000			4,300
Kansas.....	1900	27,980	27,680							300
	1890	19,605	8,690				10,625			290
Kentucky.....	1900	104,125	93,835							10,290
	1890	69,800	21,400	27,200			16,900			4,300
Louisiana.....	1900	12,640								12,640
	1890	32,570								32,570
Maine.....	1900	7,161								7,161
	1890	50,800	44,000							6,800
Maryland.....	1900	361,501							20,000	341,501
	1890	208,475	12,167	8,080	111,000	40,500	2,400	300	250	123,778
Massachusetts.....	1900	293,833	35,435						25,607	232,791
	1890	334,401	67,500		23,500		30,000		35,000	178,401
Michigan.....	1900	29,641								29,641
	1890	31,700								31,700
Minnesota.....	1900	206,300								206,300
	1890	131,550	110,000				250		5,300	16,000
Mississippi.....	1900	18,400	18,400							
	1890	44,000	44,000							
Missouri.....	1900	78,177	63,170							15,007
	1890	180,389	149,713	8,946			1,600		2,000	23,130
Montana.....	1900	950								950
	1890									
Nebraska.....	1900									
	1890									
Nevada.....	1900									
	1890									
New Hampshire.....	1900								35,000	3,000
	1890	38,000								
New Jersey.....	1900	5,070,566	35,500		51,444	442,854	372,350	494,870	125,500	2,848,548
	1890	4,793,901	22,299	95,600	418,733	520,311	376,021	425,688	363,826	2,565,438

¹ The report for the Twelfth Census is for the calendar year 1899.

² Includes sanitary or plumber's earthenware to the value of \$1,214,400 in the state of New Jersey.

³ Includes 1 establishment in Rhode Island.

TABLE 16.—CLAY PRODUCTS: COMPARATIVE SUMMARY, KINDS, QUANTITY, AND VALUE OF PRODUCTS, BY STATES AND TERRITORIES: 1890 AND 1900¹—Continued.

STATES AND TERRITORIES.	Year.	POTTERY.								
		Total value.	Stoneware.	Yellow and Rockingham ware.	C. C., or cream-colored ware.	White granite ware.	Semivitreous porcelain-ware.	China (porcelain).	Art pottery and porcelain.	All other pottery products.
New Mexico.....	{ 1900 1890	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York.....	{ 1900 1890	\$649,592 788,792	\$33,344 186,293	.....	\$15,729	\$43,568	\$1,650	\$336,680 33,351	\$1,000 115,000	\$278,568 394,201
North Carolina.....	{ 1900 1890	19,931 18,120	19,671 9,600	.....	.....	.....	2,780	.....	.....	260 740
North Dakota.....	{ 1900 1890	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio.....	{ 1900 1890	6,994,805 3,546,449	582,132 487,391	\$159,553 275,299	789,044 571,399	1,143,990 1,002,843	2,676,412 105,280	424,428	428,795 334,648	790,461 768,589
Oklahoma.....	{ 1900 1890	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon.....	{ 1900 1890	11,204	.....	.....	.....	.....	.....	.....	.....	11,204
Pennsylvania.....	{ 1900 1890	1,164,517 762,198	174,450 200,950	19,636	35,800	200,757 63,357	79,000	.....	60,000	789,810 303,455
South Carolina.....	{ 1900 1890	9,535 11,675	8,485 1,875	.....	.....	.....	.....	.....	.....	1,050 9,800
South Dakota.....	{ 1900 1890	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee.....	{ 1900 1890	67,920 29,180	66,920 15,780	.....	.....	.....	.....	.....	.....	1,000 13,400
Texas.....	{ 1900 1890	81,507 80,530	67,647 46,720	.....	.....	.....	.....	.....	.....	13,860 34,810
Utah.....	{ 1900 1890	7,700	.....	.....	.....	.....	.....	.....	.....	7,700
Vermont.....	{ 1900 1890	23,748	22,500	1,248	.....	.....	.....	.....	.....	.....
Virginia.....	{ 1900 1890	9,105 16,140	.....	.....	.....	.....	.....	.....	.....	9,105 1,900
Washington.....	{ 1900 1890	13,350 3,570	13,350 720	.....	.....	.....	.....	.....	.....	2,850
West Virginia.....	{ 1900 1890	585,310 18,872	16,464 11,572	.....	.....	.....	.....	.....	.....	568,846 7,300
Wisconsin.....	{ 1900 1890	13,145 45,065	.....	.....	.....	.....	.....	.....	.....	13,145 15,711
Wyoming.....	{ 1900 1890	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other states and territories. ²	{ 1900 1890	35,000	25,500	4,600	.....	.....	.....	.....	.....	4,900

¹The report for the Twelfth Census is for the calendar year 1899.²Includes establishments distributed as follows: Brick and tile—Indian Territory, 1; Rhode Island, 2. Pottery—Delaware, 2; Florida, 1; Nebraska, 1; Oregon, 1; Rhode Island, 2; Utah, 1.

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900.¹

	United States.	Alabama.	Arizona.	Arkansas.	California.	Colorado.	Connecticut. ²	Delaware.
Number of establishments.....	5,428	72	19	55	56	65	37	25
Character of organization—								
Individual.....	3,815	41	11	37	32	35	17	18
Firm and limited partnership.....	1,501	25	7	13	11	18	11	5
Incorporated company.....	599	6	1	5	13	12	9	2
Miscellaneous.....	8							
Capital:								
Total.....	\$82,086,488	\$481,749	\$56,945	\$310,295	\$1,205,295	\$525,725	\$1,578,276	\$283,637
Land.....	\$20,227,140	\$37,105	\$8,320	\$77,585	\$244,643	\$154,225	\$407,296	\$17,685
Buildings.....	\$21,095,183	\$123,025	\$10,555	\$98,280	\$411,428	\$81,325	\$474,871	\$58,695
Machinery, tools, and implements.....	\$17,240,838	\$107,801	\$8,695	\$65,069	\$176,607	\$139,930	\$281,022	\$54,730
Cash and sundries.....	\$23,514,277	\$163,958	\$31,375	\$69,361	\$372,617	\$150,245	\$465,087	\$152,527
Proprietors and firm members.....	6,652	93	24	66	60	76	39	27
Salaried officials, clerks, etc.:								
Total number.....	2,426	44	3	23	45	18	58	9
Total salaries.....	\$2,024,688	\$24,719	\$2,700	\$17,721	\$42,790	\$18,450	\$60,155	\$8,860
Officers of corporations—								
Number.....	563	6		8	11	4	14	2
Salaries.....	\$658,924	\$6,000		\$7,400	\$13,040	\$7,200	\$21,500	\$2,500
General superintendents, managers, clerks, etc.—								
Total number.....	1,863	38	3	15	34	14	44	7
Total salaries.....	\$1,370,759	\$18,719	\$2,700	\$10,321	\$29,750	\$11,250	\$38,655	\$6,360
Men—								
Number.....	1,779	37	2	15	33	14	37	7
Salaries.....	\$1,335,278	\$17,969	\$2,100	\$10,321	\$29,510	\$11,250	\$37,099	\$6,360
Women—								
Number.....	84	1	1		1		7	
Salaries.....	\$35,486	\$750	\$600		\$240		\$1,556	
Wage-earners, including pieceworkers, and total wages:								
Greatest number employed at any one time during the year.....	112,179	2,038	220	868	1,807	955	1,765	375
Least number employed at any one time during the year.....	58,019	1,019	122	418	685	476	642	156
Average number.....	61,979	1,122	89	402	720	438	1,029	215
Wages.....	\$21,883,333	\$250,703	\$46,980	\$100,252	\$332,724	\$237,105	\$421,452	\$70,063
Men, 16 years and over—								
Average number.....	59,956	992	88	382	710	435	1,013	211
Wages.....	\$21,577,962	\$239,852	\$45,752	\$97,582	\$330,326	\$236,310	\$417,753	\$69,338
Women, 16 years and over—								
Average number.....	76		1		2		7	1
Wages.....	\$16,857		\$70		\$504		\$1,970	\$100
Children, under 16 years—								
Average number.....	1,947	130	5	20	8	3	9	3
Wages.....	\$283,514	\$16,851	\$1,158	\$2,670	\$1,894	\$795	\$1,729	\$625
Average number of wage-earners, including pieceworkers, employed during each month: ³								
Men, 16 years and over—								
January.....	19,887	456	39	190	265	125	260	30
February.....	20,367	477	51	205	297	122	273	30
March.....	30,787	710	101	264	372	195	364	64
April.....	62,802	1,241	129	417	672	386	999	229
May.....	89,158	1,515	157	505	1,037	705	1,410	302
June.....	98,938	1,447	136	510	1,137	723	1,563	296
July.....	93,103	1,365	112	589	1,161	728	1,586	345
August.....	90,878	1,346	101	511	1,123	714	1,082	347
September.....	83,897	1,108	76	432	1,010	654	1,038	324
October.....	84,711	977	53	391	692	433	1,492	274
November.....	41,536	742	38	305	412	250	616	181
December.....	28,433	507	9	250	314	182	331	110
Children, under 16 years—								
January.....	444	56		7	2	1		
February.....	456	55		3		1		
March.....	779	120		11		1	6	
April.....	2,105	184	7	25		3	8	
May.....	3,157	197	7	34		4	15	3
June.....	3,321	191	6	30	9	5	15	7
July.....	3,322	160	4	34	21	6	15	7
August.....	3,236	161	4	40	20	6	15	7
September.....	2,873	143	7	25	19	6	9	7
October.....	2,027	141	7	18	11	5	9	5
November.....	984	95	4	11	4	1		
December.....	660	62		6	2	1	2	
Miscellaneous expenses:								
Total.....	\$3,584,319	\$38,046	\$9,950	\$7,392	\$62,027	\$36,888	\$63,835	\$7,772
Rent of works.....	\$620,013	\$6,464	\$325	\$282	\$5,516	\$12,932	\$4,130	\$5,089
Taxes, not including internal revenue.....	\$382,419	\$2,713	\$725	\$1,356	\$4,974	\$2,958	\$7,116	\$592
Rent of offices, interest, insurance, and all sundry expenses not hitherto included.....	\$2,421,546	\$10,844	\$400	\$5,804	\$46,537	\$19,328	\$52,589	\$2,091
Contract work.....	\$160,341	\$18,025	\$8,500		\$5,000	\$1,620		
Materials used:								
Total cost.....	\$11,006,148	\$142,932	\$15,202	\$51,724	\$165,843	\$86,197	\$176,784	\$22,439
Clay purchased—								
Tons.....	586,432	1,000		537	2,415	3,441	90,000	60
Cost.....	\$335,668	\$1,000		\$537	\$1,227	\$4,266	\$14,400	\$60
Coal, used as an ingredient—								
Tons.....	85,090	388			579	3,262	3,623	4
Cost.....	\$131,658	\$795			\$1,320	\$4,123	\$6,845	\$5
Sand—								
Tons.....	211,444	4,085	300	1,651	2,190	2,966	3,419	88
Cost.....	\$189,803	\$3,419	\$290	\$1,661	\$1,847	\$2,239	\$1,308	\$140
Manganese—								
Pounds.....	1,128,280					300	500	
Cost.....	\$19,004					\$3	\$5	
Salt—								
Tons.....	1,100				5	21		
Cost.....	\$6,460				\$38	\$159		

¹The report for the Twelfth Census is for the calendar year 1899.²Includes 1 establishment in Rhode Island.³The average number of women, 16 years and over, employed during each month is not shown in the table on account of the small number reported.

CLAY PRODUCTS.

921

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	United States.	Alabama.	Arizona.	Arkansas.	California.	Colorado.	Connecticut. ²	Delaware.
Materials used—Continued.								
Total cost—Continued.								
Iron—								
Pounds.....	2,402,200							
Cost.....	\$2,641							
Coloring matter.....	\$9,622					\$12	\$885	\$125
Carbonate of barium.....	\$8,355							
Fuel.....	\$8,774,852	\$110,449	\$14,105	\$37,391	\$124,875	\$67,727	\$188,537	\$20,945
Rent of power and heat.....	\$9,768				\$1,415		\$375	
Mill supplies.....	\$411,935	\$5,402	\$457	\$1,675	\$4,362	\$3,077	\$3,262	\$755
All other materials.....	\$500,437	\$5,172	\$350	\$1,224	\$21,384	\$2,420	\$9,201	\$265
Freight.....	\$605,945	\$16,695		\$9,236	\$9,375	\$2,171	\$2,016	\$144
Products.								
Total value.....	\$51,270,476	\$667,794	\$101,758	\$277,207	\$834,262	\$497,828	\$901,850	\$167,692
Common brick—								
Number of 1,000.....	7,455,212	106,495	15,655	39,961	129,302	73,729	150,665	18,310
Value.....	\$38,650,478	\$595,659	\$101,688	\$257,107	\$798,410	\$409,772	\$751,239	\$137,526
Red front brick (both pressed and wire-cut)								
Number of 1,000.....	267,430	8,545		110	2,766	5,313	4,800	2,212
Value.....	\$2,397,171	\$20,110		\$950	\$30,813	\$57,934	\$42,000	\$23,566
Fancy colored front brick (all except red)								
Number of 1,000.....	124,446					300		
Value.....	\$1,601,441					\$6,000		
Ornamental-shaped brick (all brick not rectangular, plain brick)—								
Number of 1,000.....	15,672		2		25	60	44	20
Value.....	\$429,588		\$120		\$395	\$3,422	\$1,600	\$900
Vitrified paving brick—								
Number of 1,000.....	474,740	5,000		1,000		1,850	5,000	
Value.....	\$3,857,179	\$40,000		\$10,000		\$19,100	\$50,000	
Drain tile—								
Value.....	\$3,195,434	\$825		\$9,150	\$2,218	\$1,100		\$5,700
All other products—								
Value.....	\$1,189,185	\$1,700			\$2,425		\$56,520	
Power:								
Number of establishments reporting.....	3,232	41	1	12	21	21	36	5
Total horsepower (owned).....	177,205	1,501	25	555	1,583	1,083	3,421	342
Engines—								
Steam—								
Number.....	3,781	45	1	13	28	21	53	2
Horsepower.....	175,456	1,501	25	555	1,468	1,083	3,421	346
Gas or gasoline—								
Number.....	45							
Horsepower.....	909							
Water wheels—								
Number.....	10							
Horsepower.....	208							
Electric motors—								
Number.....	17				5			
Horsepower.....	505				115			
Other power—								
Number.....	6							
Horsepower.....	127							
Machinery:								
Clay-grinding machines—								
Disintegrators.....	2,033	21	11	16	15	12	30	10
Dry pans.....	596	2		2	1	13	5	
All other.....	1,560	28	7	13	8	14	5	5
Clay-tempering machines—								
Ring pits.....	1,825	42	6	20	14	17		9
Pug mills.....	2,080	20	10	21	62	46	32	6
Wet pans.....	152	1		2	2			5
All other.....	243	4		4	1	3	1	1
Molding machines—								
Soft mud.....	2,683	16	3	20	34	17	47	4
Stiff mud.....	1,283	22		4	5	9	6	3
Dry presses.....	434	8		3	1	12	3	2
Shape-brick power presses.....	619	6		4	2	2	3	1
Hand presses.....	1,003	10	5	15	20	13	3	13
Sewer-pipe presses.....	44							
Tile machines.....	1,160	2		5	2	1		1
All other.....	435	2		2	1	2	1	2
Mold sanders.....	2,109	32		23	23	7	45	15
Dryers.....	4,104	40	8	18	37	42	23	3
All other machines.....	674	1		2	4	1	5	3
Establishments classified by number of persons employed, not including proprietors and firm members:								
Total number of establishments.....	5,423	72	19	55	56	65	37	25
No employees.....								
Under 5.....	17		2		1			
5 to 20.....	660		6	2	5	7		10
21 to 50.....	3,174	29	10	45	33	43	7	11
51 to 100.....	1,120	33	1	6	10	12	21	2
101 to 250.....	322	9		1	4	3	5	1
251 to 500.....	115	1		1	3		3	1
501 to 1,000.....	11						1	
Over 1,000.....	3							
	1							

¹ The report for the Twelfth Census is for the calendar year 1899.

² Includes 1 establishment in Rhode Island.

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	District of Columbia.	Florida.	Georgia.	Idaho.	Illinois.	Indiana.	Indian Territory.	Iowa.
Number of establishments.....	11	17	70	23	566	558	13	339
Character of organization—								
Individual.....	4	7	39	18	362	368	6	191
Firm and limited partnership.....	4	6	18	5	141	153	7	110
Incorporated company.....	3	4	13	.....	62	34	.....	37
Miscellaneous.....	.....	.....	.....	.....	1	3	.....	1
Capital:								
Total.....	\$715,840	\$195,885	\$1,045,179	\$49,467	\$9,198,944	\$4,505,080	\$26,077	\$3,076,355
Land.....	\$469,280	\$62,250	\$257,732	\$8,880	\$2,145,974	\$972,048	\$3,043	\$574,097
Buildings.....	\$92,650	\$46,400	\$213,320	\$10,125	\$2,688,093	\$1,356,516	\$5,130	\$1,036,217
Machinery, tools, and implements.....	\$88,270	\$44,575	\$239,455	\$7,340	\$2,369,067	\$1,030,364	\$9,784	\$727,441
Cash and sundries.....	\$65,640	\$42,660	\$334,672	\$23,112	\$1,995,810	\$1,146,152	\$8,120	\$738,600
Proprietors and firm members.....	12	19	77	23	688	691	22	441
Salaried officials, clerks, etc.:								
Total number.....	17	11	59	.....	208	148	1	94
Total salaries.....	\$16,304	\$9,550	\$45,745	.....	\$217,513	\$104,310	\$720	\$65,068
Officers of corporations—								
Number.....	3	.....	17	.....	66	31	.....	29
Salaries.....	\$5,000	.....	\$18,550	.....	\$85,637	\$20,880	.....	\$25,698
General superintendents, managers, clerks, etc.—								
Total number.....	14	11	42	.....	142	117	1	65
Total salaries.....	\$11,304	\$9,550	\$27,195	.....	\$131,876	\$74,430	\$720	\$39,370
Men—								
Number.....	13	11	41	.....	134	111	1	59
Salaries.....	\$10,944	\$9,550	\$27,120	.....	\$128,336	\$71,730	\$720	\$36,620
Women—								
Number.....	1	.....	1	.....	8	6	.....	6
Salaries.....	\$360	.....	\$75	.....	\$3,540	\$2,700	.....	\$2,750
Wage-earners, including pieceworkers, and total wages:								
Greatest number employed at any one time during the year.....	657	384	2,788	181	9,125	6,589	149	4,062
Least number employed at any one time during the year.....	355	225	1,683	119	5,272	4,325	90	2,106
Average number.....	437	253	1,701	43	5,224	3,609	45	1,986
Wages.....	\$166,483	\$66,449	\$347,297	\$17,664	\$2,130,854	\$1,195,540	\$17,960	\$768,860
Men, 16 years and over—								
Average number.....	437	246	1,633	43	5,111	3,510	43	1,942
Wages.....	\$166,483	\$64,350	\$341,099	\$17,664	\$2,113,241	\$1,180,437	\$17,658	\$761,368
Women, 16 years and over—								
Average number.....	.....	.....	2	.....	.....	1	.....	1
Wages.....	.....	.....	\$500	.....	.....	\$150	.....	\$360
Children, under 16 years—								
Average number.....	.....	12	66	.....	113	98	2	43
Wages.....	.....	\$1,599	\$5,698	.....	\$17,613	\$14,958	\$302	\$7,132
Average number of wage-earners, including pieceworkers, employed during each month: ²								
Men, 16 years and over—								
January.....	169	182	845	.....	1,571	1,361	3	334
February.....	171	198	862	.....	1,627	1,341	3	317
March.....	444	223	1,199	14	2,714	1,759	24	650
April.....	582	280	1,982	38	5,418	3,818	76	1,946
May.....	640	294	2,279	110	7,184	5,201	95	3,149
June.....	643	312	2,294	131	8,036	5,489	76	3,332
July.....	604	280	2,108	90	7,901	5,329	87	3,273
August.....	607	289	2,080	65	7,728	5,269	60	3,160
September.....	505	225	2,000	38	7,335	4,879	47	3,032
October.....	440	251	1,745	18	5,853	3,780	18	2,292
November.....	202	217	1,242	6	3,673	2,210	18	1,253
December.....	171	205	962	.....	2,484	1,656	10	572
Children, under 16 years—								
January.....	9	17	.....	.....	26	15	.....	1
February.....	9	18	.....	.....	20	14	.....	1
March.....	12	28	.....	.....	34	16	.....	4
April.....	16	80	.....	.....	98	123	.....	40
May.....	16	102	.....	.....	170	180	5	79
June.....	16	94	.....	.....	192	183	.....	85
July.....	14	91	.....	.....	209	184	.....	89
August.....	11	106	.....	.....	205	167	.....	90
September.....	11	100	.....	.....	184	139	.....	80
October.....	11	76	.....	.....	129	97	.....	41
November.....	7	42	.....	.....	56	33	.....	2
December.....	7	32	.....	.....	38	20	.....	1
Miscellaneous expenses:								
Total.....	\$34,926	\$5,354	\$44,687	\$1,071	\$326,909	\$161,722	\$2,231	\$115,897
Rent of works.....	\$400	\$2,675	\$9,505	\$257	\$17,086	\$14,622	\$1,661	\$11,509
Taxes, not including internal revenue.....	\$4,312	\$702	\$6,678	\$186	\$36,648	\$25,026	\$159	\$14,462
Rent of offices, interest, insurance, and all sundry expenses not hitherto included.....	\$29,714	\$2,477	\$28,104	\$628	\$258,825	\$120,230	\$461	\$83,732
Contract work.....	\$500	.....	\$400	.....	\$14,397	\$1,844	.....	\$6,194
Materials used:								
Total cost.....	\$62,569	\$33,248	\$264,016	\$8,233	\$1,025,681	\$552,447	\$6,419	\$400,313
Clay purchased—								
Tons.....	26,860	.....	8,075	30	21,508	31,163	180	7,643
Cost.....	\$7,150	.....	\$8,075	\$30	\$13,336	\$34,307	\$130	\$5,823
Coal used as an ingredient—								
Tons.....	.....	.....	.....	101	5,360	784	85	923
Cost.....	.....	.....	.....	\$275	\$8,631	\$1,473	\$120	\$1,632
Sand—								
Tons.....	825	.....	769	39	8,193	15,545	133	5,137
Cost.....	\$845	.....	\$764	\$41	\$7,775	\$16,025	\$133	\$4,766
Manganese—								
Pounds.....	.....	.....	12,000	.....	69,998	42,100	.....	20,660
Cost.....	.....	.....	\$100	.....	\$1,072	\$578	.....	\$223
Salt—								
Tons.....	.....	.....	.....	2	140	219	.....	162
Cost.....	.....	.....	.....	\$15	\$798	\$857	.....	\$977

¹The report for the Twelfth Census is for the calendar year 1899.

²The average number of women, 16 years and over, employed during each month is not shown in the table on account of the small number reported.

CLAY PRODUCTS.

923

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	District of Columbia.	Florida.	Georgia.	Idaho.	Illinois.	Indiana.	Indian Territory.	Iowa.
Materials used—Continued.								
Total cost—Continued.								
Iron—								
Pounds					14,000	368,000		
Cost					\$15	\$368		
Coloring matter			\$100	\$5	\$128	\$2,545		\$40
Carbonate of barium			\$1,232		\$40			
Fuel	\$46,997	\$25,558	\$198,811	\$7,236	\$847,907	\$428,321	\$5,467	\$378,378
Rent of power and heat					\$600	\$312		\$27
M. l. supplies	\$1,602	\$2,231	\$11,690	\$151	\$34,707	\$30,482	\$114	\$15,253
All other materials	\$1,975	\$3,787	\$13,396	\$100	\$33,186	\$14,295		\$14,271
Freight	\$4,000	\$1,672	\$29,848	\$380	\$77,486	\$22,254	\$350	\$38,428
Products:								
Total value	\$364,142	\$134,803	\$1,053,255	\$43,609	\$5,081,394	\$2,931,211	\$35,075	\$1,976,323
Common brick—								
Number of 1,000	45,657	25,974	201,551	6,155	654,267	358,416	5,680	211,705
Value	\$358,232	\$131,268	\$966,855	\$43,209	\$3,186,302	\$1,702,074	\$35,075	\$1,277,997
Red front brick (both pressed and wire-cut)—								
Number of 1,000	434		8,000		13,604	10,857		10,999
Value	\$5,310		\$70,600		\$114,789	\$107,153		\$91,361
Fancy colored front brick (all except red)—								
Number of 1,000	20	60	500		12,597	3,000		6,256
Value	\$600	\$600	\$7,500		\$132,635	\$30,000		\$69,279
Ornamental-shaped brick (all brick not rectangular, plain brick)—								
Number of 1,000			160		753	319		150
Value			\$4,550		\$27,868	\$8,341		\$4,700
Vitrified paving brick—								
Number of 1,000			600		87,079	28,120		25,905
Value			\$3,750		\$692,270	\$258,471		\$194,144
Drain tile—								
Value		\$1,921		\$400	\$904,060	\$315,545		\$291,445
All other products—								
Value		\$1,014			\$23,570	\$9,627		\$47,397
Power:								
Number of establishments reporting	7	11	58	1	362	394	3	188
Total horsepower (owned)	502	488	3,120	20	23,901	12,721	125	8,567
Engines—								
Steam—								
Number	9	16	76	1	436	409	3	199
Horsepower	442	488	3,120	20	23,810	12,688	125	8,448
Gas or gasoline—								
Number	1				5	6		5
Horsepower	60				39	133		119
Water wheels—								
Number					1			
Horsepower					2			
Electric motors—								
Number					1			
Horsepower					25			
Other power—								
Number					1			
Horsepower					25			
Machinery:								
Clay-grinding machines—								
Disintegrators	8	10	35	2	201	185	1	112
Dry pans	1		3		71	21		47
All other	4	5	20	6	216	108	1	95
Clay-tempering machines—								
Ring pits	16	5	16	1	108	224	2	84
Pug mills	8	13	23	17	164	106	5	151
Wet pans			1	2	13	10		12
All other			1		38	29		4
Molding machines—								
Soft mud	1	2	17	10	174	171	1	95
Stiff mud		15	39		215	64	3	121
Dry presses	5	1	5		62	18	1	36
Shape-brick power presses			7	2	64	37		17
Hand presses	12	4	30	5	79	64	3	61
Sewer-pipe presses	1				2	5		3
Tile machines		4	1	1	241	248	1	115
All other	5		1		8	5		34
Mold sanders		13	17	1	45	68	1	286
Dryers	71	13	17	4	694	217		367
All other machines		5	2	1	52	46		42
Establishments classified by number of persons employed, not including proprietors and firm members:								
Total number of establishments	11	17	70	23	566	558	13	339
No employees					2	1		4
Under 5			1	4	68	137	2	44
5 to 20		11	21	19	398	347	9	244
21 to 50	5	4	30		69	57	2	40
51 to 100	5	2	11		17	8		6
101 to 250	1		7		10	8		1
251 to 500					2			
501 to 1,000								
Over 1,000								

¹The report for the Twelfth Census is for the calendar year 1899.

MANUFACTURES.

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	Kansas.	Kentucky.	Louisiana.	Maine.	Maryland.	Massachu- setts.	Michigan.	Minnesota.
Number of establishments.....	57	84	58	71	45	81	177	104
Character of organization—								
Individual.....	35	52	37	53	27	51	113	70
Firm and limited partnerships.....	12	22	14	13	12	21	49	25
Incorporated company.....	10	10	7	5	6	9	15	8
Miscellaneous.....								
Capital:								
Total.....	\$754,710	\$805,446	\$672,188	\$454,953	\$3,992,800	\$2,318,664	\$1,497,847	\$1,040,656
Land.....	\$96,513	\$144,280	\$182,255	\$94,101	\$1,586,110	\$669,263	\$477,012	\$343,158
Buildings.....	\$220,186	\$297,087	\$209,280	\$93,085	\$1,002,355	\$381,134	\$258,957	\$211,435
Machinery, tools, and implements.....	\$251,944	\$143,330	\$112,901	\$68,438	\$1,001,091	\$431,215	\$322,078	\$170,670
Cash and sundries.....	\$186,067	\$220,749	\$167,702	\$199,329	\$403,244	\$337,049	\$439,300	\$510,393
Proprietors and firm members.....	67	97	66	78	50	108	220	123
Salaries of officials, clerks, etc.:								
Total number.....	49	36	43	24	57	54	52	34
Total salaries.....	\$29,184	\$25,843	\$25,935	\$7,914	\$52,399	\$44,205	\$20,943	\$22,890
Officers of corporations—								
Number.....	10	7	6	1	7	6	19	10
Salaries.....	\$8,225	\$5,170	\$4,900	\$600	\$11,000	\$8,450	\$16,380	\$8,525
General superintendents, managers, clerks, etc.—								
Total number.....	39	29	37	23	50	48	33	24
Total salaries.....	\$20,959	\$20,673	\$21,035	\$7,314	\$41,399	\$35,755	\$13,563	\$14,365
Men—								
Number.....	37	28	36	22	49	47	31	24
Salaries.....	\$20,470	\$19,473	\$20,835	\$7,014	\$41,070	\$35,580	\$13,113	\$14,365
Women—								
Number.....	2	1	1	1	1	1	2	
Salaries.....	\$489	\$1,200	\$200	\$300	\$329	\$175	\$450	
Wage-earners, including pieceworkers, and total wages:								
Greatest number employed at any one time during the year.....	1,571	1,670	1,706	917	2,448	2,800	2,968	1,833
Least number employed at any one time dur- ing the year.....	681	850	880	421	944	1,049	1,213	843
Average number.....	905	918	1,044	392	1,501	1,429	1,443	849
Wages.....	\$314,330	\$251,547	\$260,633	\$162,105	\$453,143	\$622,311	\$479,786	\$323,890
Men, 16 years and over—								
Average number.....	392	374	944	391	1,434	1,426	1,396	810
Wages.....	\$312,594	\$246,757	\$248,423	\$162,025	\$450,918	\$621,661	\$472,170	\$322,010
Women, 16 years and over—								
Average number.....			2				19	5
Wages.....			\$480				\$3,277	\$1,170
Children, under 16 years—								
Average number.....	13	44	98	1	17	3	28	34
Wages.....	\$1,736	\$4,790	\$11,730	\$80	\$2,225	\$650	\$4,339	\$5,680
Average number of wage-earners, including piece- workers, employed during each month: ²								
Men, 16 years and over—								
January.....	490	212	490	65	751	331	296	127
February.....	494	235	533	65	692	330	335	122
March.....	603	465	813	75	943	422	377	172
April.....	1,006	931	1,043	237	1,461	1,284	1,234	700
May.....	1,218	1,249	1,123	685	2,152	2,296	2,329	1,554
June.....	1,110	1,314	1,246	768	2,186	2,493	2,573	1,491
July.....	1,124	1,355	1,326	815	1,961	2,662	2,564	1,644
August.....	1,056	1,355	1,287	823	2,301	2,507	2,550	1,441
September.....	1,071	1,268	1,180	706	1,988	2,179	2,246	1,232
October.....	991	1,057	902	298	1,398	1,490	1,257	671
November.....	803	623	708	100	1,073	783	591	237
December.....	742	423	627	55	902	392	394	129
Children, under 16 years—								
January.....	1	4	55	4	2	2	1	2
February.....	1	4	70		2	2		2
March.....	7	4	79		3	2		2
April.....	29	42	115	3	8	4	28	26
May.....	35	53	119		33	4	50	61
June.....	34	80	130		34	4	53	63
July.....	16	90	124	4	35	5	56	70
August.....	14	92	118		35	4	60	72
September.....	12	76	112		27	4	45	64
October.....	4	58	107		21	2	25	36
November.....		20	77		2	2	12	2
December.....		3	70		2	1	8	2
Miscellaneous expenses:								
Total.....	\$57,709	\$23,718	\$47,404	\$24,940	\$51,366	\$90,672	\$55,197	\$32,987
Rent of works.....	\$1,284	\$4,045	\$4,280	\$3,455	\$2,703	\$16,532	\$12,038	\$539
Taxes, not including internal revenue.....	\$5,843	\$4,127	\$3,450	\$3,248	\$10,692	\$18,564	\$6,672	\$6,761
Rent of offices, interest, insurance, and all sundry expenses not hitherto included.....	\$43,982	\$14,021	\$36,324	\$16,425	\$37,911	\$52,325	\$36,062	\$23,437
Contract work.....	\$7,100	\$1,525	\$3,350	\$1,812		\$2,750	\$375	\$2,250
Materials used:								
Total cost.....	\$156,294	\$127,603	\$102,476	\$106,026	\$155,934	\$400,365	\$238,556	\$185,234
Clay purchased—								
Tons.....	15,558	3,670		100	488	44,905	1,539	225
Cost.....	\$15,558	\$14,141		\$100	\$688	\$34,905	\$1,322	\$525
Coal, used as an ingredient—								
Tons.....	600	55		310	16	2,668	365	45
Cost.....	\$945	\$59		\$630	\$18	\$4,980	\$794	\$70
Sand—								
Tons.....	2,162	3,490	636	1,312	2,975	15,644	2,393	1,321
Cost.....	\$2,361	\$3,456	\$536	\$1,760	\$3,724	\$8,319	\$2,631	\$1,310
Manganese—								
Pounds.....					109,000			20,000
Cost.....					\$1,090			\$450
Salt—								
Tons.....	16		1					54
Cost.....	\$82		\$5					\$261

¹ The report for the Twelfth Census is for the calendar year 1899.

² The average number of women, 16 years and over, employed during each month is not shown in the table on account of the small number reported.

CLAY PRODUCTS.

925

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	Kansas.	Kentucky.	Louisiana.	Maine.	Maryland.	Massachusetts.	Michigan.	Minnesota.
Materials used—Continued.								
Total cost—Continued.								
Iron—								
Pounds	28,000					200,000	50,000	40,000
Cost	\$28					\$300	\$50	\$80
Coloring matter	\$39	\$25				\$290	\$8	\$160
Carbonate of barium								\$160
Fuel	\$121,068	\$94,695	\$92,502	\$98,366	\$118,888	\$302,294	\$195,970	\$148,672
Rent of power and heat		\$10		\$860				\$915
Mill supplies	\$3,316	\$3,101	\$4,348	\$1,768	\$4,576	\$4,885	\$9,352	\$4,509
All other materials	\$2,400	\$4,130	\$4,297	\$947	\$31,620	\$29,289	\$18,410	\$8,920
Freight	\$5,497	\$7,986	\$788	\$2,200	\$335	\$14,603	\$10,019	\$19,272
*Products:								
Total value	\$724,851	\$630,889	\$581,588	\$439,975	\$844,935	\$1,468,264	\$1,185,569	\$772,308
Common brick—								
Number of 1,000	76,545	96,023	101,887	72,649	110,909	280,207	198,814	136,226
Value	\$393,090	\$609,524	\$514,313	\$399,110	\$678,147	\$1,255,434	\$926,911	\$711,825
Red front brick (both pressed and wire-cut)—								
Number of 1,000	4,422	2,505	1,780	5,586	11,867	2,250	3,780	1,915
Value	\$36,868	\$20,275	\$14,775	\$39,165	\$86,460	\$31,200	\$52,960	\$14,810
Fancy colored front brick (all except red)—								
Number of 1,000					2,218	10	340	2,000
Value					\$68,468	\$80	\$5,000	\$26,000
Ornamental-shaped brick (all brick not rectangular, plain brick)—								
Number of 1,000	36	16		50	198	2,710	510	116
Value	\$1,074	\$250		\$500	\$6,897	\$181,550	\$11,280	\$4,088
Vitrified paving brick—								
Number of 1,000	40,635	5,019			50		2,400	
Value	\$276,384	\$62,698			\$700		\$28,800	
Drain tile—								
Value	\$5,950	\$31,092	\$1,000	\$1,200	\$3,673		\$107,284	\$10,400
All other products—								
Value	\$11,000	\$17,000	\$1,500			\$50,000	\$3,384	\$5,190
Power:								
Number of establishments reporting	28	39	30	13	19	59	150	68
Total horsepower (owned)	2,274	1,890	1,217	516	2,613	3,858	5,649	2,484
Engines—								
Steam—								
Number	38	41	32	12	49	73	158	70
Horsepower	2,274	1,890	1,217	491	2,613	3,833	5,629	2,342
Gas or gasoline—								
Number								7
Horsepower								142
Water wheels—								
Number						1	1	
Horsepower						25	20	
Electric motors—								
Number				3				
Horsepower				25				
Other power—								
Number								
Horsepower								
Machinery:								
Clay-grinding machines—								
Disintegrators	17	28	19	41	12	39	96	45
Dry pans	19	4	8	1	8	1	8	1
All other	9	18	16	29	11	38	52	19
Clay-tempering machines—								
Ring pits	6	31	32	18	69	8	37	49
Pug mills	31	36	28	19	41	58	39	25
Wet pans	2	1	1	5	1	2	3	15
All other	3	3	3	5		9	6	4
Molding machines—								
Soft mud	11	33	25	103	22	76	118	49
Stiff mud	21	13	12	4	20	10	76	27
Dry presses	11	3	5		3		8	3
Shape-brick power presses	4	3	1		2	1	14	5
Hand presses	14	10	15	17	41	25	24	21
Sewer-pipe presses							2	
Tile machines	4	10	2	1	6		82	9
All other	4	18		6	2		3	10
Mold sanders	20	52	11	10	15	98	21	41
Dryers	37	70	98	11	36	180	105	44
All other machines	8	1	8		2		2	3
Establishments classified by number of persons employed, not including proprietors and firm members:								
Total number of establishments	57	84	58	71	45	81	177	104
No employees.								
Under 5	9	4	2	10	3	3	20	6
5 to 20	31	52	31	49	33	25	112	56
21 to 50	10	23	15	10	6	40	39	39
51 to 100	4	3	8	2		9	4	2
101 to 250	2	2	2		2	4	2	
251 to 500	1							
501 to 1,000								
Over 1,000					1			

¹ The report for the Twelfth Census is for the calendar year 1899.

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	Mississippi.	Missouri.	Montana.	Nebraska.	Nevada.	New Hampshire.	New Jersey.	New Mexico.
Number of establishments.....	74	219	23	106	7	55	76	10
Character of organization—								
Individual.....	40	133	15	60	4	39	41	4
Firm and limited partnership.....	24	58	6	31	3	14	21	5
Incorporated company.....	10	27	2	15		2	14	1
Miscellaneous.....		1						
Capital:								
Total.....	\$494,524	\$6,051,078	\$107,145	\$1,275,533	\$19,905	\$655,713	\$3,607,413	\$80,895
Land.....	\$71,664	\$1,196,076	\$7,335	\$172,050	\$1,850	\$166,900	\$902,441	\$3,550
Buildings.....	\$164,265	\$1,050,803	\$20,350	\$356,005	\$6,350	\$113,953	\$970,897	\$6,100
Machinery, tools, and implements.....	\$117,123	\$849,871	\$23,080	\$230,125	\$1,685	\$111,120	\$450,797	\$18,165
Cash and sundries.....	\$141,472	\$2,954,326	\$55,480	\$517,853	\$10,020	\$268,740	\$1,283,278	\$7,530
Proprietors and firm members.....	94	260	27	134	10	71	76	16
Salaried officials, clerks, etc.:								
Total number.....	38	97	9	40		34	79	4
Total salaries.....	\$20,322	\$112,717	\$3,540	\$26,446		\$17,746	\$33,169	\$3,900
Officers of corporations—								
Number.....	4	33		12		1	14	1
Salaries.....	\$2,400	\$54,843		\$3,460		\$312	\$33,233	\$900
General superintendents, managers, clerks, etc.—								
Total number.....	34	64	9	28		33	65	3
Total salaries.....	\$17,922	\$57,874	\$3,540	\$17,986		\$17,434	\$49,936	\$3,000
Men—								
Number.....	33	60	7	27		33	62	3
Salaries.....	\$17,622	\$54,934	\$2,460	\$17,806		\$17,434	\$48,475	\$3,000
Women—								
Number.....	1	4	2	1			3	
Salaries.....	\$300	\$2,940	\$1,080	\$180			\$1,461	
Wage-earners, including pieceworkers, and total wages:								
Greatest number employed at any one time during the year.....	1,728	4,366	343	1,708	46	1,217	3,843	142
Least number employed at any one time during the year.....	946	2,171	177	880	46	649	1,162	60
Average number.....	908	2,440	194	855	14	591	2,370	81
Wages.....	\$200,946	\$866,946	\$69,388	\$327,544	\$9,885	\$227,615	\$835,635	\$33,586
Men, 16 years and over—								
Average number.....	851	2,305	122	837	14	587	2,320	80
Wages.....	\$195,088	\$848,925	\$68,598	\$324,256	\$9,885	\$227,012	\$826,598	\$33,486
Women, 16 years and over—								
Average number.....			1			2	12	
Wages.....			\$350			\$399	\$3,807	
Children, under 16 years—								
Average number.....	57	135	1	18		2	83	1
Wages.....	\$5,858	\$18,021	\$450	\$3,288		\$204	\$5,250	\$100
Average number of wage-earners, including pieceworkers, employed during each month: ²								
Men, 16 years and over—								
January.....	327	914	7	127		109	628	31
February.....	324	800	7	154		112	626	45
March.....	612	1,431	36	229	3	102	1,059	69
April.....	910	2,696	130	1,052	3	409	2,472	101
May.....	1,129	3,364	193	1,444	3	1,085	3,385	100
June.....	1,109	3,499	272	1,452	96	1,137	3,556	89
July.....	1,294	3,450	231	1,386	43	1,122	3,529	97
August.....	1,285	3,347	234	1,294	38	1,116	3,365	100
September.....	1,066	2,931	226	1,262	21	993	3,264	106
October.....	912	2,421	70	964	5	581	2,321	106
November.....	708	1,641	46	476	5	162	1,950	74
December.....	444	1,117	12	207	6	111	1,080	45
Children, under 16 years—								
January.....	20	20					12	
February.....	20	20		2			12	
March.....	48	45					11	
April.....	71	160		17			41	4
May.....	71	235		33		5	56	4
June.....	77	275		33		5	59	
July.....	75	244	4	36		4	63	
August.....	77	224	4	39		4	64	
September.....	72	197	4	33		4	62	
October.....	65	122		16		2	56	
November.....	48	52		6			11	
December.....	41	25					9	
Miscellaneous expenses:								
Total.....	\$25,882	\$170,569	\$3,640	\$41,334	\$541	\$26,287	\$180,105	\$1,203
Rent of works.....	\$2,434	\$20,504	\$1,046	\$6,436	\$85	\$4,210	\$23,526	\$240
Taxes, not including internal revenue.....	\$3,566	\$22,020	\$357	\$5,003	\$68	\$4,719	\$12,229	\$582
Rent of offices, interest, insurance and all sundry expenses not hitherto included.....	\$19,657	\$119,593	\$2,037	\$29,895	\$388	\$15,858	\$142,403	\$275
Contract work.....	\$225	\$3,452	\$200			\$1,500	\$1,917	\$150
Materials used:								
Total cost.....	\$98,871	\$472,120	\$30,150	\$203,247	\$3,499	\$146,675	\$319,637	\$18,523
Clay purchased—								
Tons.....	260	12,233	480	8,821		400	6,733	5,000
Cost.....	\$260	\$14,808	\$480	\$9,113		\$400	\$4,680	\$2,500
Coal, used as an ingredient—								
Tons.....	176	2,338	300	352			8,190	
Cost.....	\$176	\$4,809	\$500	\$933			\$10,072	
Sand—								
Tons.....	1,202	6,109	726	1,971	240	976	2,431	75
Cost.....	\$1,103	\$4,734	\$811	\$2,084	\$240	\$976	\$2,395	\$75
Manganese—								
Pounds.....		193,000		56,700			76,000	
Cost.....		\$1,975		\$734			\$3,489	
Salt—								
Tons.....	1	35	1	104		4		
Cost.....	\$5	\$158	\$5	\$553		\$30		

¹The report for the Twelfth Census is for the calendar year 1899.²The average number of women, 16 years and over, employed during each month is not shown in the table on account of the small number reported.

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	Mississippi.	Missouri.	Montana.	Nebraska.	Nevada.	New Hampshire.	New Jersey.	New Mexico.
Materials used—Continued.								
Total cost—Continued.								
Iron—								
Pounds		3,000		119,000			366,000	
Cost		\$3		\$214			\$400	
Coloring matter				\$5			\$1,225	\$12
Carbonate of barium	\$3							
Fuel	\$87,414	\$415,032	\$25,112	\$159,658	\$3,167	\$135,129	\$226,613	\$15,024
Rent of power and heat			\$500					
Mill supplies	\$4,152	\$10,638	\$642	\$5,821	\$67	\$3,759	\$11,285	\$372
All other materials	\$1,506	\$10,841	\$800	\$6,168	\$25	\$1,761	\$27,797	\$245
Freight	\$4,252	\$9,127	\$1,300	\$18,014		\$4,620	\$31,681	
Products:								
Total value	\$522,325	\$1,988,250	\$134,334	\$839,815	\$17,850	\$537,752	\$1,845,950	\$77,190
Common brick—								
Number of 1,000	88,203	250,295	20,260	118,952	2,085	98,900	300,891	6,212
Value	\$508,135	\$1,330,816	\$133,260	\$779,236	\$17,440	\$505,951	\$1,355,132	\$44,100
Red front brick (both pressed and wire-cut):								
Number of 1,000	1,195	21,524	72	1,588		2,193	9,550	2,099
Value	\$12,775	\$177,996	\$1,037	\$28,053		\$21,801	\$132,650	\$18,590
Fancy colored front brick (all except red)—								
Number of 1,000		8,451	2				19,915	500
Value		\$102,973	\$37				\$310,350	\$6,500
Ornamental-shaped brick (all brick not rectangular, plain brick)—								
Number of 1,000		1,054		59			1,375	
Value		\$49,213		\$4,143			\$25,618	
Vitrified paving brick—								
Number of 1,000		22,579		2,110				
Value		\$188,615		\$15,090				
Drain tile—								
Value	\$1,035	\$34,801					\$21,800	\$1,000
All other products—								
Value	\$380	\$103,836		\$17,693	\$410	\$10,500	\$900	\$7,000
Power:								
Number of establishments reporting	29	75	8	51		24	55	4
Total horsepower (owned)	1,483	4,378	848	2,254		1,068	4,798	255
Engines—								
Steam—								
Number	32	111	6	56		25	87	4
Horsepower	1,483	4,363	236	2,128		1,068	4,773	255
Gas or gasoline—								
Number		1	1	1				
Horsepower		15	12	16				
Water wheels—								
Number				2				
Horsepower				50				
Electric motors—								
Number			2					
Horsepower			100					
Other power—								
Number				1			1	
Horsepower				60			25	
Machinery:								
Clay-grinding machines—								
Disintegrators	13	48	5	33	6	39	61	
Dry pans		15	1	6			3	8
All other	21	120	9	25	3	53	18	1
Clay-tempering machines—								
Ring pits	20	44		14	2	36	193	2
Pug mills	19	47	10	42	9	59	18	7
Wet pans	5				4	4	4	
All other	7	14		1		5		
Molding machines—								
Soft mud	21	40	12	49	2	67	149	2
Stiff mud	13	38	4	35		10	15	1
Dry presses	1	52		7			6	3
Shape-brick power presses	4	13	1	4		3	16	
Hand presses	17	36	5	23		27	51	4
Sewer-pipe presses								
Tile machines	3	22		3			7	
All other		2		1		17	1	1
Mold sanders	42	23	5	29		12	64	2
Dryers	77	271		150	4	23	42	2
All other machines	3	7		1			20	2
Establishments classified by number of persons employed, not including proprietors and firm members:								
Total number of establishments	74	219	23	106	7	55	76	10
No employees.								
Under 5	1	30		8	1	3	4	1
5 to 20	45	149	19	70	6	25	22	7
21 to 50	20	27	3	23		20	22	2
51 to 100	7	6	1	4		6	19	
101 to 250	1	4					8	
251 to 500		1					1	
501 to 1,000		1						
Over 1,000								

¹The report for the Twelfth Census is for the calendar year 1899.

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	New York.	North Carolina.	North Dakota.	Ohio.	Oklahoma.	Oregon.	Pennsylvania.	South Carolina.	South Dakota.
Number of establishments.....	217	157	12	686	36	46	385	76	11
Character of organization—									
Individual.....	113	85	5	484	26	28	220	45	6
Firm and limited partnership.....	68	53	6	189	8	12	110	24	6
Incorporated company.....	36	13	1	63	2	5	55	7	5
Miscellaneous.....		1				1			
Capital:									
Total.....	\$8,740,660	\$445,187	\$174,050	\$7,343,627	\$109,825	\$194,469	\$10,506,823	\$340,960	\$64,125
Land.....	\$2,483,632	\$91,710	\$34,950	\$1,634,603	\$12,415	\$30,450	\$2,798,468	\$42,680	\$7,050
Buildings.....	\$1,982,756	\$72,795	\$33,150	\$2,205,306	\$15,065	\$30,275	\$2,885,801	\$50,130	\$11,200
Machinery, tools, and implements.....	\$1,833,949	\$129,981	\$21,000	\$1,497,825	\$39,840	\$59,165	\$2,108,046	\$106,961	\$15,125
Cash and sundries.....	\$2,440,823	\$150,701	\$84,950	\$2,006,893	\$43,005	\$80,579	\$2,710,508	\$141,189	\$30,750
Proprietors and firm members.....	258	216	20	853	42	52	507	107	19
Salaried officials, clerks, etc.:									
Total number.....	183	36	4	208	5	18	269	41	
Total salaries.....	\$167,031	\$10,949	\$2,600	\$189,192	\$3,845	\$9,264	\$247,674	\$19,606	
Officers of corporations—									
Number.....	82	6	1	66		5	61	7	
Salaries.....	\$41,061	\$2,480	\$1,200	\$71,220		\$3,304	\$81,448	\$7,000	
General superintendents, managers, clerks, etc.—									
Total number.....	151	30	3	142	5	7	208	34	
Total salaries.....	\$125,970	\$8,469	\$1,400	\$117,972	\$3,845	\$6,960	\$166,226	\$12,606	
Men—									
Number.....	147	30	3	135	5	6	198	34	
Salaries.....	\$123,352	\$8,469	\$1,400	\$115,119	\$3,845	\$6,600	\$162,222	\$12,606	
Women—									
Number.....	4			7		1	10		
Salaries.....	\$2,618			\$2,853		\$360	\$4,004		
Wage-earners, including pieceworkers, and total wages:									
Greatest number employed at any one time during the year.....	12,277	3,125	283	8,832	449	571	10,585	2,408	164
Least number employed at any one time during the year.....	5,438	1,896	162	5,497	263	328	5,906	1,335	95
Average number.....	6,737	1,408	108	5,853	173	220	6,733	1,145	48
Wages.....	\$2,764,879	\$269,042	\$48,477	\$1,966,971	\$62,902	\$97,636	\$2,620,291	\$241,106	\$10,057
Men, 16 years and over—									
Average number.....	6,662	1,920	101	5,240	170	214	6,433	1,085	48
Wages.....	\$2,748,130	\$260,824	\$46,877	\$1,948,024	\$62,263	\$96,228	\$2,568,282	\$235,294	\$19,637
Women, 16 years and over—									
Average number.....	1		3	6		1	2	5	
Wages.....	\$225		\$600	\$1,086		\$276	\$270	\$563	
Children, under 16 years—									
Average number.....	74	88	4	107	3	5	298	55	
Wages.....	\$16,524	\$8,218	\$1,000	\$17,861	\$639	\$1,132	\$57,789	\$5,249	
Average number of wage-earners, including pieceworkers, employed during each month: ²									
Men, 16 years and over—									
January.....	783	330	12	2,158	39	36	3,034	379	
February.....	894	336	12	2,323	63	43	2,991	402	
March.....	1,408	606	17	3,063	123	130	4,315	781	
April.....	6,495	1,803	20	5,124	294	282	6,984	1,343	63
May.....	10,873	2,348	200	7,334	387	374	8,748	1,701	115
June.....	11,448	2,299	240	7,718	302	446	8,313	1,843	126
July.....	11,427	2,127	251	7,758	235	394	8,698	1,704	98
August.....	11,227	2,070	245	7,581	200	344	8,502	1,741	88
September.....	10,653	1,853	142	7,154	172	242	8,113	1,426	32
October.....	8,380	1,183	46	5,600	136	151	7,090	882	42
November.....	4,375	541	12	3,888	39	81	5,681	509	12
December.....	1,983	344	11	3,164	44	45	4,728	356	
Children, under 16 years—									
January.....	6	9		13			73	18	
February.....	6	12		13			71	19	
March.....	6	25		14		5	140	31	
April.....	52	106		94	3	7	334	78	
May.....	132	171	7	188	9	8	465	104	
June.....	184	177	12	200	9	8	468	102	
July.....	143	161	12	203	9	11	480	93	
August.....	147	168	12	207	4	8	458	86	
September.....	184	131	9	187	4	5	430	61	
October.....	89	62	2	124		4	334	38	
November.....	35	22		28		2	196	21	
December.....	6	13		19		2	131	16	
Miscellaneous expenses:									
Total.....	\$561,721	\$19,277	\$2,615	\$337,959	\$3,469	\$11,372	\$535,607	\$25,162	\$1,378
Rent of works.....	\$235,210	\$5,157	\$200	\$28,507	\$483	\$1,993	\$112,412	\$7,474	\$335
Taxes, not including internal revenue.....	\$53,434	\$2,247	\$883	\$35,845	\$607	\$920	\$34,100	\$3,095	\$274
Rent of offices, interest, insurance, and all sundry expenses not hitherto included.....	\$271,552	\$11,563	\$1,532	\$264,396	\$2,369	\$6,909	\$343,219	\$13,893	\$269
Contract work.....	\$1,525	\$310		\$9,211		\$1,550	\$45,376	\$700	
Materials used:									
Total cost.....	\$1,108,595	\$146,911	\$30,484	\$981,676	\$24,420	\$37,119	\$1,137,944	\$181,615	\$12,625
Clay purchased—									
Tons.....	17,073	922		65,516	367	1,765	56,175	1,935	
Cost.....	\$11,031	\$922		\$34,066	\$392	\$1,775	\$37,733	\$1,935	
Coal, used as an ingredient—									
Tons.....	41,749	1,325		5,635	248	5	3,212		
Cost.....	\$64,693	\$1,859		\$9,170	\$521	\$10	\$2,782		\$610
Sand—									
Tons.....	64,943	1,718	960	13,590	978	1,371	20,206	725	15
Cost.....	\$57,620	\$1,559	\$960	\$13,118	\$978	\$1,352	\$18,528	\$725	\$15
Manganese—									
Pounds.....	113,000			238,568	1,500	1,000	153,954		
Cost.....	\$2,081			\$4,096	\$30	\$20	\$2,768		
Salt—									
Tons.....				50	39	15	38		
Cost.....				\$372	\$281	\$95	\$245		

¹The report for the Twelfth Census is for the calendar year 1899.²The average number of women, 16 years and over, employed during each month is not shown in the table on account of the small number reported.

CLAY PRODUCTS.

929

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	New York.	North Carolina.	North Dakota.	Ohio.	Oklahoma.	Oregon.	Pennsylvania.	South Carolina.	South Dakota.
Materials used—Continued.									
Total cost—Continued.									
Iron—									
Pounds.....				86,000	106,000		400,200		
Cost.....				\$90	\$106		\$402		
Coloring matter.....	\$1,529			\$2,017			\$155		
Carbonate of barium.....	\$5,118			\$1,800			\$2		
Fuel.....	\$791,637	\$126,459	\$26,540	\$775,515	\$20,390	\$90,579	\$856,818	\$118,571	\$11,260
Rent of power and heat.....	\$1,660	85		\$25		\$99	85	\$290	
Mill supplies.....	\$45,649	\$6,631	\$593	\$51,644	\$702	\$1,304	\$51,535	\$7,895	\$550
All other materials.....	\$72,715	\$4,706	\$251	\$26,809	\$650	\$1,653	\$62,361	\$4,722	\$190
Freight.....	\$54,862	\$4,769	\$2,195	\$62,954	\$370		\$105,112	\$2,507	
Products:									
Total value.....	\$5,684,320	\$641,280	\$131,874	\$4,629,587	\$149,712	\$227,141	\$5,954,415	\$573,438	\$46,150
Common brick—									
Number of 1,000.....	1,232,935	122,958	22,660	450,047	17,278	27,675	767,329	118,932	6,575
Value.....	\$5,199,242	\$621,748	\$131,874	\$2,341,063	\$112,692	\$180,086	\$4,441,875	\$544,838	\$46,150
Red front brick (both pressed and wire cut)—									
Number of 1,000.....	15,629	2,070		26,961	650	810	50,163	3,985	
Value.....	\$110,588	\$14,262		\$238,919	\$10,500	\$2,040	\$468,845	\$25,600	
Fancy colored front brick (all except red)—									
Number of 1,000.....	7,671	5		18,554			31,290	52	
Value.....	\$112,718	\$150		\$197,961			\$412,116	\$620	
Ornamental-shaped brick (all brick not rectangular, plain brick)—									
Number of 1,000.....	110			2,565		39	2,463		
Value.....	\$1,109			\$40,837		\$950	\$54,099		
Vitrified paving brick—									
Number of 1,000.....	20,893	735		118,804			78,155		
Value.....	\$224,073	\$4,220		\$924,585			\$668,717		
Draintile—									
Value.....	\$26,400	\$500		\$836,631		\$18,415	\$13,339	\$2,240	
All other products—									
Value.....	\$9,535	\$400		\$49,591	\$26,520	\$25,650	\$5,424	\$140	
Power:									
Number of establishments reporting.....	180	71	5	523	8	21	262	67	4
Total horsepower (owned).....	18,107	2,493	165	22,715	253	511	20,921	2,342	162
Engines—									
Steam—									
Number.....	223	80	6	570	8	22	338	75	4
Horsepower.....	17,989	2,438	125	22,671	252	511	20,790	2,242	162
Gas or gasoline—									
Number.....	8		2	3			7	1	
Horsepower.....	53		40	14			131	100	
Water wheels—									
Number.....	1	1		1	1				
Horsepower.....	50	10		30	1				
Electric motors—									
Number.....									
Horsepower.....									
Other power—									
Number.....	2								
Horsepower.....	15								
Machinery:									
Clay-grin ling machines:									
Disintegrators.....	117	51	1	203	19	12	164	24	1
Dry pans.....	24	2		101	1		170	1	
All other.....	72	49	3	142	10	9	63	30	5
Clay-tempering machines:									
Ring pits.....	241	38	6	95	13	8	134	4	1
Pug mills.....	85	40	5	178	16	23	249	19	7
Wet pans.....		3		10	3		18	1	
All other.....	18	3		20	7	14	22		
Molding machines:									
Soft mud.....	562	26	14	195	9	19	190	24	2
Stiff mud.....	43	37		119	4	10	109	24	3
Dry presses.....	12	3		40	2	2	58	6	
Shape-brick power presses.....	22	4		61		6	253	2	
Hand presses.....	25	32	2	58	7	5		10	6
Sewer-pipe presses.....	1			3			23		
Tile machines.....	27	4		305		17	6	2	
All other.....	12	39		19	1		166	6	
Mold sanders.....	302	32	8	80	13	4	391	5	2
Dryers.....	144	107	37	349	5	12	359	17	10
All other machines.....	277	4		60		4	21	2	
Establishments classified by number of persons employed, not including proprietors and firm members:									
Total number of establishments.....	217	157	12	686	36	46	355	76	11
No employees.....						1			
Under 5.....	7	7	1	156	3	2	34	1	2
5 to 20.....	44	99	7	406	30	37	168	30	8
21 to 50.....	85	45	3	89	2	6	131	34	
51 to 100.....	51	5		32	1		43	3	1
101 to 250.....	22	1		3			8	3	
251 to 500.....	8						1		
501 to 1,000.....									
Over 1,000.....	2								

¹The report for the Twelfth Census is for the calendar year 1899.

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	Tennessee.	Texas.	Utah.	Vermont.	Virginia.	Washington.	West Virginia.	Wisconsin.	Wyoming.
Number of establishments	91	143	49	15	80	32	42	168	4
Character of organization—									
Individual	54	100	26	12	44	19	17	117	4
Firm and limited partnership	30	29	21	2	23	7	14	30	
Incorporated company	7	14	2	1	13	6	11	21	
Miscellaneous									
Capital:									
Total	\$891,095	\$1,298,271	\$171,357	\$99,298	\$1,531,352	\$370,325	\$609,576	\$2,210,504	\$6,775
Land	\$148,572	\$141,747	\$16,778	\$14,700	\$450,897	\$100,662	\$115,012	\$545,033	
Buildings	\$206,834	\$453,207	\$43,661	\$23,520	\$306,861	\$98,150	\$201,480	\$401,845	\$4,275
Machinery, tools, and implements	\$156,862	\$376,550	\$61,530	\$14,525	\$340,485	\$74,984	\$173,305	\$648,719	\$600
Cash and sundries	\$878,827	\$321,767	\$49,888	\$46,553	\$433,109	\$96,529	\$119,779	\$614,907	\$2,000
Proprietors and firm members	121	161	77	15	90	29	48	165	4
Salaried officials, clerks, etc.:									
Total number	34	64	11	5	56	27	22	61	
Total salaries	\$31,020	\$51,491	\$6,705	\$3,864	\$46,221	\$27,520	\$18,422	\$48,521	
Officers of corporations—									
Number	1	12	2	2	12	6	6	22	
Salaries	\$1,200	\$14,850	\$1,380	\$2,400	\$9,818	\$8,400	\$9,750	\$15,610	
General superintendents, managers, clerks, etc.—									
Total number	33	52	9	3	44	21	16	39	
Total salaries	\$29,820	\$36,641	\$5,325	\$1,464	\$36,403	\$19,120	\$11,672	\$32,911	
Men—									
Number	32	51	7	3	42	20	16	36	
Salaries	\$29,220	\$36,401	\$4,325	\$1,464	\$35,503	\$18,640	\$11,672	\$32,155	
Women—									
Number	1	1	2		2	1		3	
Salaries	\$600	\$240	\$1,000		\$900	\$480		\$756	
Wage-earners, including pieceworkers, and total wages:									
Greatest number employed at any one time during the year	2,235	2,746	508	257	2,297	675	917	3,000	36
Least number employed at any one time during the year	1,040	1,495	256	32	1,289	352	535	1,328	22
Average number	1,152	1,579	249	115	1,418	329	550	1,409	11
Wages	\$293,335	\$419,573	\$89,245	\$42,722	\$403,696	\$185,884	\$184,376	\$542,015	\$4,900
Men, 16 years and over—									
Average number	1,075	1,532	228	114	1,342	324	523	1,410	11
Wages	\$283,887	\$413,505	\$85,550	\$42,622	\$394,686	\$184,674	\$181,102	\$531,388	\$4,900
Women, 16 years and over—									
Average number						1		1	
Wages						\$600		\$100	
Children, under 16 years—									
Average number	77	47	21	1	76	4	27	58	
Wages	\$9,448	\$6,068	\$3,695	\$100	\$9,010	\$560	\$3,274	\$10,527	
Average number of wage-earners, including pieceworkers, employed during each month: ²									
Men, 16 years and over—									
January	428	896	42	12	420	125	104	353	
February	390	930	60	12	396	125	137	355	
March	520	1,346	140	15	787	170	321	477	
April	1,293	1,608	209	54	1,526	340	610	868	4
May	1,576	1,975	339	199	1,900	420	743	2,325	19
June	1,633	2,012	399	245	1,957	565	717	2,497	24
July	1,714	2,074	376	248	1,970	566	761	2,589	32
August	1,484	1,984	351	244	1,927	499	752	2,471	32
September	1,393	1,734	325	204	1,872	410	727	2,267	21
October	1,089	1,487	204	86	1,583	293	603	1,420	4
November	757	1,320	167	33	1,138	208	491	934	
December	622	1,020	126	16	630	157	309	425	
Children, under 16 years—									
January	6	25			23		7	2	
February	6	30			22		13	2	
March	16	42	7		31	2	14	4	
April	62	59	11		84	7	81	49	
May	123	62	34	2	115	10	89	108	
June	140	60	42	2	116	10	43	115	
July	150	58	46	2	109	9	47	122	
August	156	58	38	2	106	4	41	99	
September	143	54	33	2	104	4	36	91	
October	77	41	17	2	89	2	18	61	
November	30	39	13		55		18	30	
December	20	32	10		50		14	13	
Miscellaneous expenses:									
Total	\$60,712	\$47,014	\$9,932	\$5,474	\$54,788	\$29,339	\$30,530	\$95,003	\$216
Rent of works	\$6,155	\$1,715	\$488	\$495	\$5,487	\$2,998	\$1,020	\$13,353	\$205
Taxes, not including internal revenue	\$4,579	\$5,677	\$825	\$493	\$5,730	\$2,375	\$3,319	\$12,058	
Rent of offices, interest, insurance, and all sundry expenses not hitherto included	\$49,658	\$38,872	\$8,589	\$2,886	\$43,436	\$14,966	\$24,991	\$69,574	\$11
Contract work	\$320	\$750	\$30	\$1,600	\$135	\$9,000	\$1,200	\$18	
Materials used:									
Total cost	\$165,819	\$234,517	\$32,666	\$18,287	\$194,653	\$81,206	\$96,969	\$730,297	\$1,033
Clay purchased—									
Tons	19,139	1,800	960	75	28,258	1,427	26,500	16,198	
Cost	\$7,923	\$1,437	\$508	\$75	\$15,258	\$327	\$13,212	\$18,703	
Coal, used as an ingredient—									
Tons	162	80	100	208	434	885	52	166	
Cost	\$290	\$155	\$125	\$385	\$854	\$655	\$67	\$247	
Sand									
Tons	2,703	2,220	650	187	2,332	962	2,483	5,805	62
Cost	\$2,875	\$2,100	\$622	\$125	\$1,417	\$1,227	\$2,321	\$5,278	\$62
Manganese—									
Pounds					20,000				
Cost					\$290				
Salt									
Tons	75	7	1		69		1	40	
Cost	\$362	\$54	\$5		\$865		\$8	\$200	

¹The report for the Twelfth Census is for the calendar year 1899.²The average number of women, 16 years and over, employed during each month is not shown in the table on account of the small number reported.

CLAY PRODUCTS.

TABLE 17.—BRICK AND TILE, BY STATES AND TERRITORIES: 1900¹—Continued.

	Tennessee.	Texas.	Utah.	Vermont.	Virginia.	Washing- ton.	West Virginia.	Wisconsin.	Wyoming.
Materials used—Continued.									
Total cost—Continued.									
Iron—									
Pounds.....		20,000			400,000	2,000		200,000	
Cost.....		\$20			\$883	\$2		\$180	
Coloring matter.....				\$367					
Carbonate of barium.....									
Fuel.....	\$128,781	\$207,778	\$26,295	\$16,755	\$157,169	\$68,651	\$65,195	\$663,321	\$950
Rent of power and heat.....	\$25		\$1,060			\$1,988		\$176	
Mill supplies.....	\$9,667	\$8,996	\$829	\$296	\$7,703	\$4,017	\$6,440	\$14,420	\$18
All other materials.....	\$12,549	\$7,543	\$2,838	\$234	\$2,668	\$2,700	\$7,637	\$20,079	
Freight.....	\$3,347	\$6,484	\$384	\$50	\$8,056	\$1,189	\$2,089	\$7,093	\$3
Products:									
Total value.....	\$684,900	\$1,020,205	\$186,440	\$99,525	\$1,006,221	\$426,553	\$436,356	\$1,795,993	\$8,460
Common brick—									
Number of 1,000.....	110,650	168,646	28,632	18,510	127,655	55,444	47,843	178,497	915
Value.....	\$541,199	\$919,625	\$164,281	\$92,725	\$759,128	\$403,378	\$256,856	\$1,071,631	\$7,300
Red front brick (both pressed and wire- cut)—									
Number of 1,000.....	9,646	3,766	1,552	400	11,104	565	1,243	4,460	60
Value.....	\$58,336	\$32,641	\$17,967	\$3,600	\$112,261	\$12,210	\$8,371	\$40,800	\$1,150
Fancy colored front brick (all except red)—									
Number of 1,000.....	29	3,470	60		4,731			2,415	
Value.....	\$267	\$26,880	\$500		\$64,940			\$19,377	
Ornamental-shaped brick (all brick not rectangular, plain brick)—									
Number of 1,000.....	100	155	41		481		2,030	91	
Value.....	\$2,083	\$2,907	\$906		\$16,117		\$22,100	\$1,975	
Vitrified paving brick—									
Number of 1,000.....	5,780	3,206			5,000	640	19,150	30	
Value.....	\$69,289	\$31,530			\$50,000	\$3,320	\$145,373	\$450	
Drain tile—									
Value.....	\$11,600	\$2,000	\$75	\$3,200	\$3,200	\$825	\$8,656	\$22,694	
All other products—									
Value.....	\$2,126	\$4,622	\$2,720		\$575	\$1,820		\$639,066	
Power:									
Number of establishments reporting.....	39	39	7	6	53	15	31	88	
Total horsepower (owned).....	2,821	2,456	367	204	3,119	694	1,680	5,156	
Engines—									
Steam—									
Number.....	49	50	7	4	66	16	33	115	
Horsepower.....	2,821	2,456	207	192	3,119	624	1,670	5,111	
Gas or gasoline—									
Number.....							1	1	
Horsepower.....							10	25	
Water wheels—									
Number.....								1	
Horsepower.....								20	
Electric motors—									
Number.....			3	1		2			
Horsepower.....			160	10		70			
Other power—									
Number.....				1					
Horsepower.....				2					
Machinery:									
Clay-grinding machines—									
Disintegrators.....	29	41	13	9	31	20	18	59	
Dry pans.....	12	20	1		3	2	11	9	
All other.....	22	50	9	15	27	7	13	61	1
Clay-tempering machines—									
Ring pits.....	39	23	4	2	25	9	4	45	
Pug mills.....	29	49	85	10	43	24	24	66	6
Wet pans.....	4	4			1	4		11	
All other.....	2	1			1	1		5	
Molding machines:									
Soft mud.....	62	13	19	19	18	18	11	91	
Stiff mud.....	27	21	8	1	24	12	13	34	
Dry presses.....	7	25	6		7	2	2	13	
Shape-brick power presses.....	11	7			12	5	8	7	
Hand presses.....	30	45	9	8	48	17	8	17	1
Sewer-pipe presses.....							2	1	
Tile machines.....	7	2		3	7		2	17	
All other.....	24	2	15				2	21	
Mold sanders.....	18	57	20	4	39	3	5	105	
Driers.....	85	39	6		97	11	42	129	1
All other machines.....	10	15	3	2	14	33		13	
Establishments classified by number of persons employed, not including proprietors and firm members:									
Total number of establishments.....	91	143	49	15	80	32	42	168	4
No employees									
Under 5.....	3	1	1			5	2	23	1
5 to 20.....	51	101	32	10	43	15	21	110	3
21 to 50.....	30	25	2	2	24	10	17	24	
51 to 100.....	6	7		1	9	1	1	6	
101 to 250.....	1	3	1		3	1	1	4	
251 to 500.....								1	
501 to 1,000.....									
Over 1,000.....									

¹The report for the Twelfth Census is for the calendar year 1899.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900.¹

	United States.	Alabama.	Arkansas.	California.	Colorado.	Connecticut.	District of Columbia.	Georgia.	Illinois.	Indiana.
Number of establishments.....	1,000	21	10	18	10	8	6	21	53	49
Character of organization—										
Individual.....	395	16	8	6	4	3	3	13	19	19
Firm and limited partnership.....	221	2	1	5	1	2	5	5	9	11
Incorporated company.....	381	8	1	7	5	5	1	3	25	18
Miscellaneous.....	8									1
Capital:										
Total.....	\$65,951,885	\$190,585	\$78,024	\$1,306,869	\$855,985	\$283,802	\$256,200	\$266,710	\$3,511,765	\$1,525,658
Land.....	\$10,567,191	\$30,710	\$6,483	\$111,704	\$169,559	\$32,450	\$55,000	\$38,125	\$429,372	\$182,103
Buildings.....	\$20,966,418	\$63,748	\$22,688	\$435,040	\$203,951	\$94,097	\$84,500	\$30,415	\$1,130,122	\$442,676
Machinery, tools, and implements.....	\$11,487,949	\$41,350	\$28,958	\$212,352	\$130,605	\$56,323	\$43,500	\$53,110	\$800,971	\$301,136
Cash and sundries.....	\$22,930,827	\$63,777	\$19,995	\$547,773	\$351,870	\$100,992	\$73,200	\$95,050	\$1,151,300	\$599,683
Proprietors and firm members.....	944	28	10	16	7	3	8	23	41	40
Salaried officials, clerks, etc.:										
Total number.....	2,777	15	4	41	42	18	5	21	153	60
Total salaries.....	\$3,011,512	\$3,450	\$4,920	\$58,540	\$59,612	\$23,201	\$6,300	\$17,800	\$201,166	\$59,673
Officers of corporations—										
Number.....	618		1	10	7	8		6	37	10
Salaries.....	\$1,129,650		\$2,000	\$23,980	\$26,800	\$11,225		\$7,700	\$88,055	\$17,550
General superintendents, managers, clerks, etc.—										
Total number.....	2,159	15	3	31	35	10	5	15	116	50
Total salaries.....	\$1,881,862	\$8,450	\$2,920	\$34,560	\$32,812	\$11,976	\$6,300	\$10,100	\$113,101	\$42,123
Men—										
Number.....	1,965	15	3	29	32	9	5	14	106	49
Salaries.....	\$1,799,144	\$8,450	\$2,920	\$33,360	\$29,812	\$11,508	\$6,300	\$9,320	\$108,695	\$41,811
Women—										
Number.....	194			2	3	1		1	10	1
Salaries.....	\$82,718			\$1,200	\$3,000	\$468		\$780	\$4,406	\$312
Wage-earners, including pieceworkers, and total wages:										
Greatest number employed at any one time during the year.....	52,688	288	124	523	463	166	121	387	2,441	1,550
Least number employed at any one time during the year.....	37,126	156	62	335	269	100	99	279	1,448	1,053
Average number.....	43,714	166	92	391	374	138	109	285	2,006	1,250
Wages.....	\$17,691,737	\$66,667	\$27,000	\$246,270	\$215,844	\$65,036	\$37,594	\$66,795	\$841,053	\$531,242
Men, 16 years and over—										
Average number.....	38,171	209	92	387	371	126	109	279	1,923	1,025
Wages.....	\$16,379,286	\$64,166	\$27,000	\$245,226	\$214,994	\$62,610	\$37,594	\$66,156	\$824,823	\$487,419
Women, 16 years and over—										
Average number.....	4,481				1	12		1	37	199
Wages.....	\$1,125,722				\$350	\$2,426		\$75	\$9,250	\$38,553
Children, under 16 years—										
Average number.....	1,062	18		4	2			5	45	26
Wages.....	\$186,729	\$2,501		\$1,044	\$500			\$564	\$6,980	\$3,270
Average number of wage-earners, including pieceworkers, employed during each month:										
Men, 16 years and over—										
January.....	32,521	173	60	280	300	131	93	329	1,506	970
February.....	33,091	163	61	344	266	134	103	306	1,467	952
March.....	35,065	199	89	352	352	138	99	317	1,724	1,016
April.....	37,876	222	96	373	364	123	103	296	1,886	1,072
May.....	39,472	232	100	462	376	118	109	258	1,994	1,076
June.....	40,193	220	111	457	413	115	114	261	2,106	1,125
July.....	40,103	246	106	428	428	119	112	238	2,119	962
August.....	41,099	231	96	410	426	116	115	245	2,153	1,025
September.....	41,444	228	100	408	412	136	115	253	2,168	1,049
October.....	40,713	213	98	408	421	133	114	234	2,058	1,018
November.....	39,065	201	92	390	360	134	115	235	1,982	1,044
December.....	37,404	180	97	333	334	115	121	274	1,903	963
Women, 16 years and over—										
January.....	4,073					14		1	36	107
February.....	4,237					14		1	21	193
March.....	4,389					13		1	30	200
April.....	4,540					12		1	39	203
May.....	4,565					12		1	37	200
June.....	4,445					11		1	37	205
July.....	4,350					12		1	36	166
August.....	4,532					12		1	36	200
September.....	4,651					13		1	37	201
October.....	4,690					12		1	33	201
November.....	4,797					12		1	40	220
December.....	4,502					11		1	45	203
Children, under 16 years—										
January.....	908	12		2				5	43	23
February.....	942	12		2				6	42	23
March.....	1,020	15		2				5	47	24
April.....	1,101	15		5		4		5	46	26
May.....	1,147	20		4		4		5	47	29
June.....	1,117	21		2		4		5	47	30
July.....	1,065	22		8		3		5	50	22
August.....	1,147	21		8		3		5	49	28
September.....	1,153	22		7		2		7	41	26
October.....	1,114	21		4		2		5	41	28
November.....	1,042	15		4		5		5	45	25
December.....	988	13		4		5		5	42	22
Miscellaneous expenses:										
Total.....	\$3,260,721	\$4,812	\$1,242	\$50,275	\$23,319	\$11,129	\$3,406	\$15,587	\$172,446	\$70,553
Rent of works.....	\$104,022	\$770	\$180	\$2,636	\$720	\$535	\$125	\$361	\$3,769	\$3,183
Taxes, not including internal revenue.....	\$300,171	\$387	\$174	\$5,324	\$3,713	\$956	\$636	\$2,051	\$11,253	\$3,391
Rent of offices, interest, insurance, and all sundry expenses not hitherto included.....	\$2,738,969	\$3,105	\$388	\$42,316	\$18,886	\$9,638	\$7,645	\$13,150	\$131,730	\$67,550
Contract work.....	\$115,559	\$50						\$25	\$20,694	\$126
Materials used:										
Total cost.....	\$11,915,236	\$59,523	\$11,863	\$261,270	\$160,852	\$41,851	\$23,885	\$42,273	\$576,001	\$312,195
China clay (domestic)—										
Tons.....	48,582								389	1,166
Cost.....	\$390,304								\$7,163	\$10,040
China clay (foreign)—										
Tons.....	14,227					15			86	251
Cost.....	\$171,790					\$202			\$1,000	\$2,753

¹ The report for the Twelfth Census is for the calendar year 1899.

CLAY PRODUCTS.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900¹—Continued.

	United States.	Alabama.	Arkansas.	California.	Colorado.	Connecticut.	District of Columbia.	Georgia.	Illinois.	Indiana.
Materials used—Continued.										
Total cost—Continued.										
Ball clay (domestic)—										
Tons.....	19,884					20			260	975
Cost.....	\$113,954					\$80			\$1,565	\$5,445
Ball clay (foreign)—										
Tons.....	12,466			25		15			55	90
Cost.....	\$116,629			\$500		\$187			\$905	\$1,416
Stoneware clay—										
Tons.....	128,136	1,200	812	140	921	104	250	100	40,105	5,686
Cost.....	\$171,161	\$1,441	\$843	\$489	\$1,255	\$488	\$187	\$210	\$41,152	\$6,001
Slip clay—										
Tons.....	3,733	80	68	12	15	1		17	458	141
Cost.....	\$17,890	\$199	\$618	\$195	\$20	\$8		\$127	\$900	\$1,048
Fire clay—										
Tons.....	1,440,805	17,960	331	7,505	9,451	5,105		50	34,459	65,203
Cost.....	\$1,554,228	\$17,995	\$938	\$5,146	\$7,911	\$4,850		\$62	\$19,362	\$44,362
Pipe clay—										
Tons.....	160,806			23,586	8,000			273	3,972	903
Cost.....	\$150,489			\$30,470	\$5,200			\$546	\$4,478	\$489
Terra cotta clay—										
Tons.....	141,053			1,327	500	4,000	200	900	9,012	225
Cost.....	\$133,339			\$1,054	\$325	\$2,400	\$450	\$900	\$12,798	\$350
Brick clay, purchased—										
Tons.....	210,807		10	8,088	52,921	195	200	25	780	210
Cost.....	\$191,918		\$10	\$5,553	\$32,637	\$250	\$250	\$25	\$490	\$252
All other clay—										
Tons.....	218,300	1,000		1,451	2	315			2,154	8,316
Cost.....	\$200,526	\$1,000		\$1,209	\$4	\$335			\$3,181	\$18,462
Coal, used as an ingredient—										
Tons.....	6,199			8		15			350	
Cost.....	\$6,731			\$75		\$30			\$580	
Sand—										
Tons.....	84,548	78	1	4,784	28	2,668		300	2,764	1,017
Cost.....	\$92,017	\$85	\$3	\$1,098	\$32	\$1,801		\$300	\$1,139	\$1,005
Manganese—										
Pounds.....	778,248	1,100	100	25,050	7,610	300		2,000	79,530	26,852
Cost.....	\$25,914	\$10	\$5	\$502	\$166	\$6		\$25	\$2,203	\$588
Salt—										
Tons.....	5,855	2	2	455	60		34	240	302	181
Cost.....	\$24,756	\$20	\$15	\$1,620	\$399		\$176	\$990	\$1,488	\$641
Iron—										
Pounds.....	12,412,872	10,000				3,000		1,000	75,000	44,000
Cost.....	\$13,184	\$10				\$3		\$1	\$75	\$44
Coloring matter	\$70,688		\$44	\$25	\$257	\$104	\$20		\$101	\$1,419
Carbonate of barium	\$15,073			\$1,000					\$2,050	
Sawdust	\$19,687		\$1	\$587					\$1,242	\$300
Flint (quartz)—										
Tons.....	51,504		1	253	10	48			279	1,190
Cost.....	\$325,434		\$5	\$586	\$25	\$240			\$2,281	\$8,597
Feldspar—										
Tons.....	31,384	2		23	10	12			805	877
Cost.....	\$265,231	\$10		\$109	\$93	\$139			\$8,047	\$7,378
Plaster—										
Tons.....	16,111	3		621	4	20		4	1,692	155
Cost.....	\$120,545	\$25		\$6,870	\$11	\$300		\$60	\$9,547	\$1,320
Liquid and coin gold	\$117,422					\$200			\$202	\$876
Oxide of lead, zinc, and cobalt	\$225,099	\$25		\$1,510	\$50	\$1,497			\$14,034	\$5,942
Packing materials (crates, hogsheads, barrels, boxes, straw, etc.)	\$586,198	\$25	\$60	\$1,292	\$1,821	\$3,810		\$875	\$17,627	\$15,492
Fuel	\$3,858,828	\$28,488	\$9,277	\$147,255	\$34,153	\$12,173	\$26,031	\$24,993	\$238,499	\$104,930
Rent of power and heat	\$11,859			\$60		\$763			\$5,380	
Mill supplies	\$346,613	\$859	\$450	\$7,680	\$2,255	\$1,616	\$746	\$2,605	\$21,012	\$5,451
All other materials	\$1,361,235	\$7,469	\$90	\$10,235	\$2,175	\$1,836	\$925	\$800	\$82,269	\$28,927
Freight	\$1,216,024	\$1,802	\$79	\$36,150	\$72,013	\$3,612		\$9,749	\$74,681	\$38,107
Products:										
Aggregate value	\$44,263,886	\$225,385	\$59,692	\$761,476	\$574,060	\$172,843	\$117,003	\$206,322	\$2,143,521	\$1,291,318
Pottery:										
Total value.....	\$17,222,040	\$25,842	\$20,071	\$31,813	\$16,050	\$31,750	\$13,770	\$25,455	\$763,005	\$346,034
Red earthenware—										
Value.....	\$762,260	\$1,180		\$24,474		\$50,850	\$18,700	\$3,240	\$52,800	\$4,318
Stoneware—										
Gallons.....	45,850,881	543,200	468,500	65,558				416,300	14,473,815	756,177
Value.....	\$1,970,710	\$24,682	\$19,840	\$4,389				\$22,215	\$572,075	\$48,648
Yellow and Rockingham ware—										
Value.....	\$150,553									
C. C., or cream-colored ware—										
Value.....	\$1,540,488									
White graniteware—										
Value.....	\$1,787,101									
Semivitreous porcelain ware (stone porcelain)—										
Value.....	\$3,048,762									
China (porcelain)—										
Value.....	\$1,255,978									
Bone china, Delit, and Belleek ware—										
Value.....	\$42,000									
Sanitary ware—										
Value.....	\$1,850,225									
Solid porcelain bath tubs, laundry tubs, etc.—										
Value.....	\$361,652									
Porcelain electrical supplies—										
Value.....	\$470,355									
Porcelain door knobs—										
Value.....	\$78,333									
Porcelain hardware trimmings—										
Value.....	\$48,528									
Art pottery and porcelain—										
Value.....	\$629,402					\$28,500				
All other pottery products—										
Value.....	\$3,216,693		\$281	\$2,950	\$16,050	\$2,400	\$70		\$138,680	\$292,563

¹ The report for the Twelfth Census is for the calendar year 1899.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900¹—Continued.

	United States.	Alabama.	Arkansas.	California.	Colorado.	Connecticut.	District of Columbia.	Georgia.	Illinois.	Indiana.
Products—Continued.										
Aggregate value—Continued.										
Terra cotta, fire, and other clay products—										
Total value.....	\$26,420,354	\$199,343	\$39,621	\$719,663	\$558,010	\$86,293	\$96,233	\$180,867	\$1,380,516	\$944,734
Architectural terra cotta—										
Value.....	\$2,027,532			\$76,000				\$44,200	\$422,009	\$22,500
Chimney tops—										
Value.....	\$242,289	\$25		\$10,800	\$250		\$400	\$1,750	\$186	\$5,100
Fireproofing, including terra cotta, lumber, and hollow building tile or blocks—										
Tons.....	326,349			850	425	2,400		500	84,574	15,047
Value.....	\$1,665,081			\$7,100	\$2,514	\$15,000		\$4,000	\$198,360	\$62,575
Roofing tile—										
Value.....	\$293,292			\$3,400					\$130,085	\$1,200
Floor tile—										
Value.....	\$755,931									\$136,811
Encaustic tile—										
Value.....	\$227,077									\$190,000
Fire brick—										
Number of 1,000.....	800,862	9,804	535	1,777	7,112	1,000		1,628	11,500	7,123
Value.....	\$8,636,562	\$114,050	\$8,100	\$28,798	\$162,638	\$28,000		\$24,400	\$132,759	\$72,350
Glass-melting pots—										
Value.....	\$407,141			\$1,000					\$260	\$18,000
Fire-clay retorts—										
Value.....	\$196,567	\$450			\$2,640				\$92	\$2,000
Furnace linings and settings—										
Value.....	\$564,211			\$1,741		\$12,000				
Locomotive tiles and tank blocks—										
Value.....	\$473,874	\$7,068		\$4,775	\$12,800	\$6,400		\$2,500	\$2,504	
Stove linings—										
Value.....	\$416,235			\$1,350		\$1,200		\$10		
Saggers—										
Value.....	\$146,186	\$50		\$600	\$58,100					\$3,800
Clay crucibles, muffles, and scorifiers—										
Value.....	\$37,969			\$583	\$20,681					
Flue linings—										
Value.....	\$310,989			\$12,620	\$2,503	\$15,000	\$4,301	\$1,500	\$30,390	\$1,170
Drain tile—										
Value.....	\$466,750		\$84	\$7,080	\$4,297		\$475	\$1,895	\$121,409	\$17,800
Sewer pipe—										
Tons.....	1,130,115			95,719	17,204		19,855	23,231	59,507	47,201
Value.....	\$4,500,334			\$479,537	\$90,218		\$69,495	\$100,612	\$229,040	\$161,900
Electrical conduits—										
Value.....	\$685,273						\$21,562			\$70,000
Enameled brick—										
Number of 1,000.....	5,785			20					438	
Value.....	\$329,969			\$1,500					\$28,609	
Vitrified paving brick—										
Number of 1,000.....	115,080	6,075	900	10	2,910				968	
Value.....	\$971,277	\$60,600	\$2,700	\$100	\$29,100				\$8,254	
Ornamental-shaped brick (all not rectangular, plain brick)—										
Number of 1,000.....	3,305	10	7	304	6					
Value.....	\$120,992	\$350	\$200	\$16,339	\$378					\$000
Fancy colored front brick (all except red)—										
Number of 1,000.....	25,455	300		826	1,697	10				
Value.....	\$480,559	\$3,750		\$28,225	\$30,546	\$230				
Red front brick (both pressed and wire-cut)—										
Number of 1,000.....	15,112	500	774	10	4,511				700	400
Value.....	\$140,741	\$4,500	\$7,740	\$400	\$42,133				\$4,630	\$2,500
Common brick—										
Number of 1,000.....	199,316	1,000	3,482	190	1,874				1,935	4,800
Value.....	\$1,024,271	\$5,000	\$20,797	\$1,600	\$12,762				\$11,685	\$19,600
All other terra cotta, fire, and other clay products ²										
Value.....	\$1,234,302	\$3,500		\$27,165	\$116,465	\$13,463			\$60,244	\$115,000
All other products.....	\$620,992	\$150				\$4,800	\$2,000			\$000
Power:										
Number of establishments reporting..	775	7	3	11	9	3	4	7	41	19
Total horsepower owned.....	77,694	429	135	1,107	1,005	165	327	416	5,133	2,033
Engines—										
Steam—										
Number.....	1,058	8	3	12	11	4	6	13	55	47
Horsepower.....	73,848	425	135	1,084	1,005	130	327	416	4,494	2,641
Gas or gasoline—										
Number.....	23									
Horsepower.....	604									
Water wheels—										
Number.....	11								6	
Horsepower.....	773								480	
Electric motors—										
Number.....	78	1	3			1			6	1
Horsepower.....	1,892	4	23			10			153	12
Other power—										
Number.....	16									
Horsepower.....	577									
Machinery and kilns:										
Pottery—										
Disintegrators (blunger).....	363				2	3		1	12	30
Agitators.....	331			1	1	2		2	11	10
Slip pumps.....	446	2	4	2	5	2		2	35	25
Lawns.....	263					2			7	21
Clay presses—										
Iron.....	389			2	1		1	1	24	19
Wood.....	76			1		1			2	1

¹ The report for the Twelfth Census is for the calendar year 1899.² Including acid-proof brick, adobes, aquaria ornaments, condensers, cupola blocks, fire kindlers, gas logs, glass-house furnace blocks, grate tile, grave markers, hollow brick, lead pots, open-hearth runner brick, patent panels, perforated paving brick, porous cups, porous hollow brick, sewer brick, sidewalk tile and blocks, statuary, stone pumps, toy marbles, vases, web tile, and well brick and tile.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900—Continued.

	United States.	Alabama.	Arkansas.	California.	Colorado.	Connecticut.	District of Columbia.	Georgia.	Illinois.	Indiana.
Machinery and kilns—Continued.										
Pottery—Continued.										
Pug mills—										
Regular.....	431	3	4	6	1	4	4	4	23	16
Sagger.....	122	1			1	1			4	4
Wad mills.....	159					2			3	4
Jiggers.....	1,210	2	1	6	2	4	1	2	78	24
Batters.....	512		1		2				3	7
Dry presses.....	276					2			3	57
Polishers.....	57								4	
Lathes.....	505	5	3	6		4		2	28	8
All other machines.....	504	2	2	7	2	4	2	2	19	6
Kilns—										
Up-draft.....	916	6	3	4	2	2	3	4	31	27
Down-draft.....	668		1	18	5	8	7	10	57	35
Muffle—										
Large.....	87	2		2					1	17
Decorating.....	275					2			4	9
All other.....	61	1	2		1			1	3	1
Terra cotta, tile, and brick—										
Clay-grinding machines—										
Disintegrators.....	217	3	4	3			3	5	11	12
Dry pans.....	448	5	2	7	5	2		4	33	16
All other.....	170	1		1	1	1	3	1	11	5
Clay-tempering machines—										
Ring pits.....	99	2	1		1				4	2
Pug mills.....	448	5	3	11	13	3	2	5	27	18
Wet pans.....	432	3		8	3	1		5	14	8
All other.....	55	1		2					1	8
Molding machines—										
Soft mud.....	284		1	2					5	10
Stiff mud.....	207	4	1	3	6				13	7
Dry presses.....	116	1	3	6	6				10	
Shape brick power presses.....	123	3	1	3	3		1	1	1	
Hand presses.....	797	7		17	17	3		3	18	4
Sewer-pipe presses.....	190		1	9	2	1	4	4	12	6
Tile machines.....	229		1	4	1		1	2	17	14
All other.....	1,433	1	10	5		2			7	10
Mold sanders.....	59									1
All other machinery.....	322			2			1	2	72	3
Kilns—										
Clamp.....	212	5	10	2	10					17
Down-draft—										
Round.....	1,971	16	3	35	25	8	16	33	116	61
Rectangular.....	817	8	1	4	2			1	30	12
Muffle.....	154	1		10				3	32	2
Continuous.....	15				1				2	
All other kilns.....	258	1	1	1	2			2	1	8
Dryers.....	759	8	1	9	6	4	1	5	36	22
Idle machinery.....	740	502		8		2		1	14	9
Establishments, classified by number of persons employed, not including proprietors and firm members:										
Total number of establishments.....	1,000	21	10	18	10	8	6	21	53	49
No employees.....	20		1	1		1			2	2
Under 5.....	188	10	1	6	2	2	2	9	14	9
5 to 20.....	291	7	7	3	4	2	2	7	8	20
21 to 50.....	196	2		5		2	2	2	15	9
51 to 100.....	139	1	1	1	2	1	1	2	8	4
101 to 250.....	130	1		2	2			1	7	5
251 to 500.....	26								1	
501 to 1,000.....	8									
Over 1,000.....	2									

	Iowa.	Kansas.	Kentucky.	Louisiana.	Maine.	Maryland.	Massachusetts.	Michigan.	Minnesota.	Mississippi.
Number of establishments.....	17	3	16	3	3	18	29	9	8	
Character of organization—										
Individual.....	8	1	8	2	2	7	14	2	3	2
Firm and limited partnership.....	4	1	2	1	1	3	6	1	1	1
Incorporated company.....	5	1	6			8	9	6	4	1
Miscellaneous.....										
Capital:										
Total.....	\$361,258	\$19,700	\$698,560	\$10,865	\$168,382	\$1,081,463	\$1,627,575	\$280,135	\$539,042	\$11,690
Land.....	\$85,550	\$1,300	\$118,553	\$5,250	\$2,500	\$64,200	\$370,850	\$44,300	\$59,882	\$700
Buildings.....	\$111,567	\$4,200	\$233,852	\$2,500	\$5,000	\$214,479	\$522,942	\$33,399	\$177,667	\$3,600
Machinery, tools, and implements.....	\$71,100	\$9,400	\$95,783	\$1,750	\$2,000	\$262,634	\$197,273	\$93,836	\$85,104	\$2,180
Cash and sundries.....	\$93,041	\$4,800	\$250,372	\$1,365	\$158,882	\$540,100	\$536,480	\$89,150	\$216,329	\$5,210
Proprietors and firm members.....	17	3	11	4	4	15	26	5	5	4
Salaried officials, clerks, etc.:										
Total number.....	13	1	47	1	9	47	72	16	15	3
Total salaries.....	\$18,359	\$1,200	\$45,416	\$700	\$10,909	\$14,243	\$60,360	\$13,150	\$24,050	\$1,500
Officers of corporations—										
Number.....	7	1	15			15	9	6	5	3
Salaries.....	\$3,832	\$1,200	\$21,188			\$15,960	\$11,400	\$6,750	\$10,200	\$1,500
General superintendents, managers, clerks, etc.—										
Total number.....	6		32	1	9	32	63	10	10	
Total salaries.....	\$4,527		\$24,228	\$700	\$10,909	\$28,283	\$48,900	\$6,400	\$13,850	
Men—										
Number.....	6		30	1	7	31	57	10	9	
Salaries.....	\$4,527		\$23,638	\$700	\$10,077	\$28,043	\$45,683	\$6,400	\$13,250	
Women—										
Number.....			2		2	1	6		1	
Salaries.....			\$590		\$832	\$240	\$3,277		\$600	
Wage-earners, including pieceworkers, and total wages:										
Greatest number employed at any one time during the year.....	318	32	1,104	22	177	1,175	758	231	508	24
Least number employed at any one time during the year.....	198	24	656	17	122	935	572	124	349	17
Average number.....	234	22	841	20	155	1,082	584	149	427	21

¹The report for the Twelfth Census is for the calendar year 1899.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900¹—Continued.

	Iowa.	Kansas.	Kentucky.	Louisiana.	Maine.	Maryland.	Massachu- setts.	Michigan.	Minnesota.	Mississippi.
Wage-earners, etc.—Continued.										
Wages.....	\$93,299	\$11,520	\$238,258	\$6,388	\$70,225	\$384,655	\$262,141	\$51,144	\$152,608	\$6,517
Men, 16 years and over—										
Average number.....	233	22	801	17	155	842	526	146	422	21
Wages.....	\$93,024	\$11,520	\$226,669	\$6,208	\$70,225	\$327,958	\$246,136	\$50,884	\$151,592	\$6,517
Women, 16 years and over—										
Average number.....			10			80	54		5	
Wages.....			\$1,729			\$31,287	\$15,064		\$1,011	
Children, under 16 years—										
Average number.....	1		30	3		160	4	3		
Wages.....	\$275		\$4,955	\$180		\$25,410	\$941	\$260		
Average number of wage-earners, including pieceworkers, employed during each month:										
Men, 16 years and over—										
January.....	101	17	671	17	146	830	436	77	360	16
February.....	176	18	693	18	143	822	460	85	364	16
March.....	199	17	719	18	147	845	458	78	364	16
April.....	240	23	811	18	135	868	558	94	402	21
May.....	267	26	828	18	152	848	568	134	475	21
June.....	281	23	835	18	174	870	589	155	470	21
July.....	276	23	819	19	169	843	622	161	478	23
August.....	279	28	848	18	163	830	632	178	475	23
September.....	278	28	866	18	161	854	609	207	477	23
October.....	264	22	901	16	164	858	482	198	459	23
November.....	289	17	800	16	158	850	458	200	367	23
December.....	194	17	796	16	148	775	440	185	360	24
Women, 16 years and over—										
January.....						80	51		6	
February.....			5			80	53		3	
March.....			8			80	59		4	
April.....			9			80	51		8	
May.....			15			80	46		6	
June.....			10			80	46		6	
July.....			15			80	48		6	
August.....			13			80	54		5	
September.....			11			80	57		5	
October.....			11			80	61		5	
November.....			13			80	61		4	
December.....			10			80	61			
Children, under 16 years—										
January.....	3		18	3		163	1	3		
February.....	3		23	3		162	1	3		
March.....	2		25	3		157	1	3		
April.....	2		30	3		161	7	3		
May.....	3		28	3		160	7	3		
June.....	3		28	3		160	8	3		
July.....	1		34	3		163	4	3		
August.....			35	3		160	5	3		
September.....			37	3		161	5	3		
October.....			39	3		159	6	3		
November.....			31	3		162	5	3		
December.....			33	3		152	3	3		
Miscellaneous expenses:										
Total.....	\$24,562	\$564	\$41,157	\$585	\$36,779	\$41,580	\$76,266	\$10,647	\$17,788	\$455
Rent of works.....			\$708	\$150		\$8,199	\$2,509	\$1,715		
Taxes, not including internal revenue.....	\$2,093	\$145	\$2,893	\$5	\$2,164	\$8,590	\$9,581	\$2,688	\$4,050	\$237
Rent of offices, interest, insurance, and all sundry expenses not hitherto included.....	\$22,219	\$419	\$36,670	\$430	\$34,615	\$21,980	\$58,850	\$6,244	\$13,738	\$218
Contract work.....	\$250		\$886			\$2,811	\$5,376			
Materials used:										
Total cost.....	\$57,267	\$5,824	\$198,659	\$5,517	\$57,716	\$196,305	\$188,278	\$36,771	\$154,378	\$1,274
China clay (domestic)—										
Tons.....			355			883	682		6	
Cost.....			\$2,059			\$7,611	\$4,479		\$93	
China clay (foreign)—										
Tons.....						8			12	
Cost.....						\$119			\$186	
Ball clay (domestic)—										
Tons.....						228	250			
Cost.....						\$1,782	\$1,500			
Ball clay (foreign)—										
Tons.....						216	242			
Cost.....						\$1,794	\$2,546			
Stoneware clay—										
Tons.....	540	560	8,215	173	301	225	1,515		7,487	75
Cost.....	\$759	\$2,032	\$14,047	\$429	\$1,215	\$370	\$3,969		\$7,719	\$170
Slip clay—										
Tons.....	3	20	71		3	16	83		5	15
Cost.....	\$64	\$180	\$600		\$50	\$96	\$412		\$25	\$207
Fire clay—										
Tons.....	150		42,518	500		6,718	11,678	500	2	
Cost.....	\$166		\$40,207	\$1,000		\$11,462	\$20,223	\$200	\$10	
Pipe clay—										
Tons.....	60		3,241	26	8,445	5,000		3,500	32,361	
Cost.....	\$180		\$10,198	\$51	\$16,685	\$2,500		\$875	\$16,810	
Terra cotta clay—										
Tons.....						426	335		800	
Cost.....						\$429	\$825		\$400	
Brick clay, purchased—										
Tons.....	243		320	450	6,675	420	3,347	200		
Cost.....	\$152		\$143	\$450	\$9,593	\$540	\$6,953	\$150		
All other clay—										
Tons.....	1	17	650		8,640	250	60			
Cost.....	\$2	\$170	\$775		\$1,141	\$250	\$60			
Coal, used as an ingredient—										
Tons.....			36		75		700			
Cost.....			\$72		\$255		\$1,500			
Sand—										
Tons.....	13	113	1,360		605	452	1,561	385	447	
Cost.....	\$13	\$113	\$1,694		\$774	\$530	\$2,470	\$142	\$357	
Manganese—										
Founds.....	300		1,350			4,300	25,061			
Cost.....	\$10		\$49			\$41	\$396			

¹ The report for the Twelfth Census is for the calendar year 1899.

CLAY PRODUCTS.

937

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900¹—Continued.

	Iowa.	Kansas.	Kentucky.	Louisiana.	Maine.	Maryland.	Massachu- setts.	Michigan.	Minnesota.	Mississippi.
Materials used—Continued.										
Total cost—Continued.										
Salt—										
Tons	100		95		78		20	40	60	6
Cost	\$700		\$395		\$326		\$148	\$120	\$267	\$63
Iron—										
Pounds.....			33,000	1,024,000						
Cost			\$33	\$1,024						
Coloring matter	\$287		\$2,580	\$5		\$5,170	\$1,026		\$8	
Carbonate of barium.....							\$1,175			
Sawdust.....			\$284	\$22					\$435	
Flint (quartz)—										
Tons			302			971	222		19	
Cost			\$1,778			\$6,694	\$2,207		\$140	
Feldspar—										
Tons			188			503	239		93	
Cost			\$1,958			\$5,339	\$2,767		\$853	
Plaster—										
Tons	7	6	65	2	2	149	240	11	120	
Cost	\$60	\$70	\$566	\$24	\$30	\$1,385	\$2,443	\$108	\$1,408	
Liquid and coin gold.....			\$22			\$5,410				
Oxide of lead, zinc, and cobalt.....	\$50		\$598			\$3,331	\$729		\$3,293	
Packing materials (crates, hogs- heads, barrels, boxes, straw, etc.)	\$909		\$3,017		\$1,075	\$14,492	\$14,840	\$1,537	\$4,888	\$5
Fuel.....	\$46,456	\$2,658	\$71,489	\$2,032	\$24,809	\$52,323	\$58,774	\$28,531	\$39,496	\$3,740
Rent of power and heat.....			\$50		\$60		\$545			
Mill supplies.....	\$2,303	\$95	\$13,630	\$55	\$277	\$5,563	\$3,711	\$1,407	\$5,215	\$64
All other materials.....	\$1,304	\$106	\$7,382	\$425	\$1,426	\$57,027	\$37,467	\$2,900	\$7,030	\$25
Freight.....	\$3,352	\$400	\$25,038			\$12,157	\$17,108	\$801	\$15,665	
Products:										
Aggregate value.....	\$243,597	\$29,060	\$724,255	\$21,877	\$222,260	\$384,331	\$713,246	\$145,021	\$445,435	\$18,400
Pottery										
Total value.....	\$29,730	\$27,980	\$104,125	\$12,640	\$7,161	\$361,501	\$293,333	\$29,641	\$206,300	\$18,400
Red earthenware—										
Value.....	\$7,332		\$10,200	\$10,000		\$9,000	\$168,231	\$29,641	\$17,535	
Stoneware—										
Gallons.....	526,360	712,000	1,979,000				593,916			356,000
Value.....	\$22,398	\$27,630	\$93,335				\$35,435			\$18,400
Art pottery and porcelain—										
Value.....						\$20,000	\$25,607			
All other pottery products—										
Value.....		\$300		\$2,640	\$7,161	\$332,501	\$60,560		\$138,765	
Terra cotta, fire, and other clay products—										
Total value.....	\$192,707	\$1,080	\$498,542	\$7,237	\$215,099	\$473,330	\$406,499	\$111,380	\$235,185	
Architectural terra cotta—										
Value.....							\$52,224			
Chimney tops—										
Value.....	\$50		\$1,780			\$1,400				
Fireproofing, including terra cotta, lumber, and hollow building tile or blocks—										
Tons.....			210				11,321	630	3,200	
Value.....			\$1,750				\$70,573	\$5,900	\$31,000	
Roofing tile—										
Value.....						\$7,255				
Floor tile—										
Value.....			\$1,500							
Encaustic tile—										
Value.....			\$1,500		\$13,989					
Fire brick—										
Number of 1,000.....	20		21,340			18,575	763	150		
Value.....	\$300		\$334,630			\$325,312	\$22,792	\$3,000		
Glass-melting pots—										
Value.....										
Fire-clay retorts—										
Value.....						\$11,500				
Furnace linings and set- tings—										
Value.....				\$2,100			\$26,154			
Locomotive tiles and tank blocks—										
Value.....					\$17,886		\$20,750			
Stove linings—										
Value.....					\$500	\$32,457	\$143,547			
Saggers—										
Value.....			\$1,344			\$3,550				
Clay crucibles, muffles, and scorifiers—										
Value.....										
Flue linings—										
Value.....			\$4,700					\$15,375		
Drain tile—										
Value.....			\$5,040	\$2,335	\$2,338		\$824	\$31,805	\$1,000	
Sewer pipe—	\$67,813	\$600	\$5,040							
Tons.....	13,634		27,051		40,000	6,000		15,485	30,400	
Value.....	\$47,719		\$104,441		\$173,455	\$24,000		\$50,300	\$168,545	
Electrical conduits—										
Value.....										
Enameled brick—										
Number of 1,000.....						1,006				
Value.....						\$42,252				
Vitrified paving brick—										
Number of 1,000.....	3,850		900		87					
Value.....	\$30,900		\$7,700		\$802					
Ornamental-shaped brick (all not rectangular, plain brick)—										
Number of 1,000.....						1	70			
Value.....						\$100	\$3,800			
Fancy colored front brick (all except red)—										
Number of 1,000.....						250	1,450			
Value.....						\$3,000	\$48,000			

¹ The report for the Twelfth Census is for the calendar year 1899.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900—Continued.

	Iowa.	Kansas.	Kentucky.	Louisiana.	Maine.	Maryland.	Massachu- setts.	Michigan.	Minnesota.	Mississippi.
Products—Continued.										
Aggregate value—Continued.										
Terra cotta, etc.—Continued.										
Total value—Continued.										
Red front brick (both pressed and wire cut)— Number of 1,000.....	45							150	20	
Value.....	\$250							\$800	\$240	
Common brick— Number of 1,000.....	7,225	60	7,481			550	230	950	9,000	
Value.....	\$42,475	\$480	\$34,167			\$3,850	\$1,333	\$4,400	\$42,000	
All other terra cotta, fire, and other clay products ² — Value.....	\$3,200			\$2,802	\$1,129	\$18,154	\$16,502		\$2,850	
All other products.....	\$26,160		\$121,588	\$2,000			\$12,914	\$4,000	\$4,000	
Power:										
Number of establishments reporting.....	18	8	12	2	3	15	22	9	6	1
Total horsepower owned.....	764	112	1,581	15	209	668	1,229	637	845	50
Engines—										
Steam—										
Number.....	13	4	20	2	4	15	29	9	10	1
Horsepower.....	762	112	1,576	15	206	645	1,196	573	845	50
Gas or gasoline—										
Number.....	1					2	1			
Horsepower.....	2					18	13			
Water wheels—										
Number.....										
Horsepower.....										
Electric motors—										
Number.....			1				2	1		
Horsepower.....			5		3		20	4		
Other power—										
Number.....								2		
Horsepower.....								60		
Machinery and kilns:										
Pottery—										
Disintegrators (blunger).....	2		6			8	2			
Agitators.....		1	5			7			4	
Slip pumps.....	8	2	9		1	7	4		3	
Lawns.....			2			6	16		1	
Clay presses:										
Iron.....	2		6	2	1	2	1			
Wood.....						5	1			
Pug mills—										
Regular.....	7		7	3		9	14	2	2	1
Sagger.....			1		1	3	2			
Wad mills.....			3			4	3			
Jiggers.....	9	2	12	1	2	25	42	6	24	2
Batters.....			1			5				
Dry presses.....			21							
Polishers.....		1								
Lathes.....	12	3	10	8	5	4	14		1	
All other machines.....	1	1	5	3		9	20	6	17	
Kilns:										
Up-draft.....	6		28	3	2	19	29	4		6
Down-draft.....	4	1	15	1			6		17	1
Muffle—										
Large.....	2		1				1	1		
Decorating.....			1				2			
All other kilns.....	1		1				4			
Terra cotta, tile, and brick:										
Clay-grinding machines—										
Disintegrators.....	2	1	6		1	5	6	1	5	1
Dry pans.....	8		12			7	8	3	1	
All other.....			3		3		2	1		
Clay-tempering machines—										
Ring pits.....			1			1	7		2	
Pug mills.....	8		12	1	6	7	9		2	
Wet pans.....	3		24			4	3	8	4	1
All other.....									2	
Molding machines—										
Soft mud.....	136		3					2	3	
Stiff mud.....	6	1	4			3	6	1	3	
Dry presses.....	3		1			1	1		1	
Shape-brick power presses.....	1		1				3			
Hand presses.....	3		16		3	21	18		1	
Sewer-pipe presses.....	2		3		4	3	2	3	2	
Tile machines.....	8	1	1		2	4	4	6	8	
All other.....	1		5		1	2	4	1		
Mold sanders.....			2						2	
All other machines.....	2						6			
Kilns—										
Clamp.....	3		10				2	1	1	
Down-draft—										
Round.....	45		43		26	12	17	48	19	
Rectangular.....	5		15			13	8		1	
Muffle.....						1	7			
Continuous.....										
All other.....	4		4			5	8		4	
Dryers.....	13		11			12	43	10	3	1
Idle machinery.....	1		5	1		7	4		3	
Establishments, classified by number of persons employed, not including pro- prietors and firm members:										
Total number of establishments.....	17	3	16	3	8	18	29	9	8	4
No employees.....							1			1
Under 5.....	5		1			2	5			2
5 to 20.....	6	3	5			7	9		1	
21 to 50.....	4		2	3	2	8	9	6	3	1
51 to 100.....	2		4			3	3	2	2	
101 to 250.....			3			1	3	1	2	
251 to 500.....			1		1		2		2	
500 to 1,000.....						2				
Over 1,000.....										

¹ The report for the Twelfth Census is for the calendar year 1899.

² Including acid-proof brick, adobes, aquaria ornaments, condensers, cupola blocks, fire kindlers, gas logs, glass-house furnace blocks, grate tile, grave markers, hollow brick, lead pots, open-hearth runner brick, patent panels, perforated paving brick, porous cups, porous hollow brick, sewer brick, sidewalk tile and blocks, statuary, stone pumps, toy marbles, vases, web tile, and well brick and tile.

CLAY PRODUCTS.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900¹—Continued.

	Missouri.	Montana.	New Jersey.	New York.	North Carolina.	Ohio.	Oregon.	Pennsylvania.	South Carolina.
Number of establishments.....	37	5	81	52	21	248	5	143	10
Character of organization—									
Individuals.....	16	1	22	26	16	68	1	46	8
Firm and limited partnership.....	4	1	13	9	4	64	1	44	2
Incorporated companies.....	17	3	46	17	1	114	3	53	
Miscellaneous.....						2			
Capital:									
Total.....	\$2,952,107	\$344,564	\$15,324,966	\$4,102,667	\$92,738	\$15,563,969	\$213,855	\$11,808,786	\$25,751
Land.....	\$377,991	\$47,500	\$2,415,663	\$908,764	\$10,645	\$1,980,872	\$50,800	\$2,080,698	\$7,350
Buildings.....	\$731,508	\$101,501	\$5,009,945	\$1,169,615	\$21,965	\$5,215,460	\$85,949	\$3,570,802	\$8,185
Machinery, tools, and implements.....	\$380,819	\$83,993	\$3,118,988	\$641,221	\$17,635	\$2,776,469	\$42,059	\$1,386,793	\$9,740
Cash and sundries.....	\$961,789	\$111,660	\$4,780,870	\$1,389,067	\$32,493	\$5,501,168	\$34,437	\$4,270,993	\$4,476
Proprietors and firm members.....	27	3	67	43	24	225	6	172	12
Salaried officials, clerks, etc.—									
Total number.....	123	7	464	176	7	318	9	468	2
Total salaries.....	\$161,997	\$9,388	\$634,238	\$200,468	\$4,700	\$765,915	\$9,416	\$450,905	\$840
Officers of corporations—									
Number.....	23		111	34		187	6	89	
Salaries.....	\$69,684		\$292,973	\$68,822		\$252,691	\$6,836	\$142,204	
Generalsuperintendents, managers, clerks, etc.—									
Total number.....	95	7	353	142	7	631	3	379	2
Total salaries.....	\$92,313	\$9,388	\$341,265	\$131,646	\$4,700	\$513,224	\$2,580	\$308,701	\$840
Men—									
Number.....	93	7	326	125	7	540	2	359	1
Salaries.....	\$91,537	\$9,388	\$330,389	\$124,600	\$4,700	\$477,287	\$2,100	\$299,367	\$840
Women—									
Number.....	2		27	17		91	1	20	1
Salaries.....	\$776		\$10,876	\$7,046		\$35,937	\$480	\$8,734	\$500
Wage-earners, including pieceworkers, and total wages:									
Greatest number employed at any one time during the year.....	2,006	226	9,459	2,774	107	13,895	78	10,548	70
Least number employed at any one time during the year.....	1,342	59	6,537	1,720	91	10,953	45	7,729	43
Average number.....	1,607	102	8,117	2,270	133	11,870	57	8,372	46
Wages.....	\$647,728	\$31,554	\$3,341,404	\$672,583	\$23,386	\$5,000,346	\$27,237	\$3,007,354	\$10,000
Men, 16 years and over—									
Average number.....	1,586	101	7,007	1,908	122	9,621	53	8,120	45
Wages.....	\$643,641	\$31,404	\$3,321,320	\$781,208	\$22,611	\$4,453,264	\$26,187	\$2,885,794	\$9,809
Women, 16 years and over—									
Average number.....			917	341	2	2,148		409	
Wages.....			\$233,282	\$88,929	\$300	\$527,777		\$60,173	
Children, under 16 years—									
Average number.....	21	1	193	21	14	101	4	343	1
Wages.....	\$4,087	\$150	\$36,302	\$2,446	\$976	\$19,805	\$1,050	\$61,387	\$200
Average number of wage-earners, including pieceworkers, employed during each month:									
Men, 16 years and over—									
January.....	1,186	45	5,901	1,555	57	8,202	44	7,555	28
February.....	1,285	21	5,999	1,504	63	8,623	43	7,568	28
March.....	1,382	33	6,399	1,660	105	8,308	43	7,840	28
April.....	1,595	35	6,855	1,923	113	9,487	50	8,106	60
May.....	1,680	119	7,228	2,074	147	9,659	54	8,343	64
June.....	1,770	141	7,430	2,010	152	9,944	62	8,227	64
July.....	1,743	157	7,549	2,086	154	9,921	61	8,001	66
August.....	1,820	215	7,680	2,103	157	10,233	56	8,181	54
September.....	1,748	177	7,570	2,127	157	10,368	62	8,559	54
October.....	1,668	89	7,547	2,044	150	10,406	60	8,464	34
November.....	1,649	73	7,146	1,923	125	10,163	46	8,308	28
December.....	1,550	63	6,605	1,878	87	9,641	47	8,283	28
Women, 16 years and over—									
January.....			886	315		1,371		354	
February.....			893	334		2,033		339	
March.....			922	343		2,069		332	
April.....			935	333	3	2,181		415	
May.....			942	345	3	2,199		414	
June.....			937	339	3	2,103		403	
July.....			907	329	3	2,112		370	
August.....			916	336	3	2,214		397	
September.....			935	357	3	2,231		456	
October.....			940	353	3	2,252		463	
November.....			950	359	1	2,330		460	
December.....			842	340		2,183		452	
Children, under 16 years—									
January.....	15		173	23	5	71	3	304	1
February.....	18		174	23	5	90	3	312	1
March.....	21		180	23	12	94	3	349	1
April.....	21		203	22	14	99	5	363	1
May.....	22		206	22	16	107	5	383	1
June.....	23		205	21	20	112	6	355	1
July.....	20	1	195	21	20	101	6	330	1
August.....	29	1	196	21	20	120	7	357	1
September.....	23	1	201	21	20	115	7	372	1
October.....	25	1	206	22	15	109	4	346	1
November.....	19	1	195	22	12	101	2	323	1
December.....	21	1	180	16	8	88	2	326	1
Miscellaneous expenses:									
Total.....	\$191,727	\$11,525	\$792,475	\$334,157	\$6,687	\$691,691	\$6,504	\$402,589	\$1,162
Rent of works.....	\$5,207	\$675	\$14,371	\$10,939	\$110	\$21,694		\$17,551	\$167
Taxes, not including internal revenue.....	\$13,716	\$1,537	\$55,198	\$25,629	\$414	\$80,224	\$693	\$43,253	\$110
Rent of offices, interest, insurance, and all sundry expenses not hitherto included.....	\$169,451	\$9,313	\$690,482	\$296,589	\$5,663	\$662,536	\$5,611	\$321,803	\$710
Contract work.....	\$3,953		\$32,424	\$1,000	\$500	\$27,137	\$200	\$19,982	\$175
Materials used:									
Total cost.....	\$369,937	\$61,456	\$2,384,059	\$522,408	\$26,596	\$3,229,385	\$23,159	\$2,451,980	\$5,371
China clay (domestic)—									
Tons.....			9,784	2,333		25,307		6,973	
Cost.....			\$99,001	\$19,481		\$199,278		\$34,168	
China clay (foreign)—									
Tons.....	2		5,382	570		5,200	1	1,059	
Cost.....	\$25		\$67,363	\$3,641		\$60,948	\$12	\$13,123	

¹The report for the Twelfth Census is for the calendar year 1899.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900—Continued.

	Missouri.	Montana.	New Jersey.	New York.	North Carolina.	Ohio.	Oregon.	Pennsylvania.	South Carolina.
Materials used—Continued.									
Total cost—Continued.									
Ball clay (domestic)—									
Tons.....	124		6,898	691		8,688	2	498	
Cost.....	\$466		\$44,379	\$4,040		\$40,995	\$10	\$2,218	
Ball clay (foreign)—									
Tons.....			4,764	86		5,885		883	
Cost.....			\$48,185	\$787		\$50,311		\$7,993	
Stoneware clay—									
Tons.....	2,717		332	2,320	755	38,112	388	5,204	182
Cost.....	\$6,667		\$2,547	\$5,127	\$1,297	\$45,294	\$2,329	\$12,106	\$250
Slip clay—									
Tons.....	160		114	35	7	1,277	1	968	5
Cost.....	\$1,155		\$1,125	\$160	\$52	\$6,800	\$7	\$2,087	\$27
Fire clay—									
Tons.....	56,620	3,300	95,108	39,662	5,000	282,167	386	750,045	250
Cost.....	\$70,258	\$16,936	\$120,825	\$51,673	\$2,000	\$200,184	\$212	\$900,855	\$375
Pipe clay—									
Tons.....	18,835		2,047	6,620		27,940	2,800	1,850	
Cost.....	\$25,208		\$1,293	\$8,149		\$11,494	\$2,100	\$2,462	
Terra cotta clay—									
Tons.....	8,980		56,557	8,343		38,630	2,350	8,236	
Cost.....	\$9,632		\$56,329	\$15,142		\$21,056	\$1,880	\$10,853	
Brick clay, purchased—									
Tons.....	4,306		79,778	3,776		22,790		16,480	
Cost.....	\$6,474		\$97,098	\$4,361		\$12,197		\$19,717	
All other clay—									
Tons.....	4,343	90	94,830	5,140	5,000	69,184	510	15,925	
Cost.....	\$4,318	\$27	\$52,871	\$6,380	\$5,000	\$71,062	\$290	\$33,249	
Coal, used as an ingredient—									
Tons.....			2,637	50		2,150			
Cost.....			\$2,737	\$100		\$1,175			
Sand—									
Tons.....	1,709	284	22,720	3,919		19,434	166	18,603	60
Cost.....	\$1,293	\$279	\$24,286	\$4,888		\$22,018	\$166	\$26,292	\$40
Manganese—									
Pounds.....	23,000	500	110,640	71,450		254,821	860	67,084	
Cost.....	\$498	\$3	\$4,916	\$2,629		\$11,486	\$46	\$1,327	
Salt—									
Tons.....	435	2	455	78	66	2,351	60	538	
Cost.....	\$1,382	\$20	\$1,895	\$341	\$334	\$9,117	\$300	\$2,719	
Iron—									
Pounds.....	4,662,000		202,000			676,322		5,658,550	
Cost.....	\$4,662		\$203			\$721		\$6,338	
Coloring matter.....	\$84	\$25	\$19,547	\$447		\$28,407		\$11,052	
Carbonate of barium.....	\$1,935		\$4,885	\$2,751		\$252		\$1,025	
Sawdust.....	\$125		\$15,017	\$404		\$563	\$205	\$422	
Flint (quartz)—									
Tons.....	3	1,739	12,712	1,107		18,367	26	12,266	3
Cost.....	\$24	\$4,410	\$88,690	\$9,653		\$146,953	\$206	\$40,115	\$8
Feldspar—									
Tons.....	17		13,664	1,023		11,630	51	1,223	2
Cost.....	\$148		\$94,511	\$10,793		\$112,968	\$331	\$10,622	\$11
Plaster—									
Tons.....	653		4,193	3,776		3,073	4	1,031	
Cost.....	\$4,053		\$34,076	\$16,007		\$27,891	\$40	\$11,685	
Liquid and coin gold.....			\$20,675	\$4,199		\$70,056		\$9,632	
Oxide of lead, zinc, and cobalt.....	\$80		\$51,412	\$2,240		\$115,319	\$34	\$18,057	
Packing materials (crates, hogsheds, barrels, boxes, straw, etc.).....	\$7,437		\$147,771	\$16,879	\$250	\$267,766	\$246	\$40,509	
Fuel.....	\$164,576	\$29,143	\$707,531	\$207,079	\$9,876	\$968,881	\$9,796	\$545,729	\$3,393
Rent of power and heat.....		\$300	\$2,580	\$735		\$109		\$1,059	
Mill supplies.....	\$12,422	\$1,209	\$46,097	\$13,690	\$2,054	\$36,317	\$570	\$38,316	\$181
All other materials.....	\$23,061	\$5,959	\$275,553	\$59,378	\$128	\$328,407	\$1,270	\$406,922	\$1,045
Freight.....	\$20,124	\$3,145	\$260,666	\$46,349	\$5,605	\$311,270	\$3,110	\$191,733	\$41
Products:									
Aggregate value.....	\$1,662,150	\$180,006	\$8,940,723	\$2,389,449	\$83,736	\$11,851,225	\$90,837	\$8,127,420	\$23,255
Pottery—									
Total value.....	\$78,177	\$950	\$5,070,566	\$649,592	\$19,031	\$6,994,805	\$11,204	\$1,164,517	\$9,535
Red earthenware—									
Value.....	\$6,379		\$24,000	\$33,955		\$164,798	\$2,501	\$99,736	\$1,000
Gallons.....	1,553,460		1,014,000	348,593	400,860	14,517,342		3,082,000	172,700
Value.....	\$63,170		\$35,500	\$33,344	\$19,671	\$582,132		\$174,450	\$8,485
Yellow and Rockingham ware—									
Value.....						\$159,533			
C. C. or cream-colored ware—									
Value.....			\$751,444			\$789,044			
White granite ware—									
Value.....			\$442,354			\$1,143,990		\$200,767	
Semivitreous porcelain ware (stone porcelain)—									
Value.....			\$372,360			\$2,676,412			
China (porcelain)—									
Value.....			\$494,870	\$336,680		\$424,428			
Bone china, Delft, and Belleek ware—									
Value.....			\$42,000						
Sanitary ware—									
Value.....			\$1,850,225						
Solid porcelain bath tubs, laundry tubs, etc.—									
Value.....			\$276,246	\$43,679				\$41,727	
Porcelain electrical supplies—									
Value.....			\$154,807	\$125,234		\$190,314			
Porcelain doorknobs—									
Value.....			\$32,000			\$46,333			
Porcelain hardware trimmings—									
Value.....			\$42,500	\$6,023					
Art pottery and porcelain—									
Value.....			\$125,500	\$1,000		\$428,795			
All other pottery products—									
Value.....	\$3,628	\$950	\$426,770	\$69,672	\$260	\$389,006	\$3,703	\$647,797	\$50

¹The report for the Twelfth Census is for the calendar year 1899.

CLAY PRODUCTS.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900¹—Continued.

	Missouri.	Montana.	New Jersey.	New York.	North Carolina.	Ohio.	Oregon.	Pennsylvania.	South Carolina.
Products—Continued.									
Aggregate value—Continued.									
Terra cotta, fire, and other clay products—									
Total value.....	\$1,530,502	\$178,128	\$3,644,010	\$1,682,358	\$63,105	\$4,843,615	\$79,633	\$6,883,330	\$11,220
Architectural terra cotta—									
Value.....	\$184,495		\$660,304	\$417,350				\$139,100	
Chimney tops—									
Value.....	\$590	\$50		\$175,025		\$29,472	\$3,045	\$2,266	
Fireproofing, including terra cotta, lumber, and hollow building tile or blocks—									
Tons.....	3,353	79	144,303	15,833		51,098	1,988	35,021	
Value.....	\$26,267	\$1,100	\$653,144	\$108,926		\$946,090	\$15,500	\$110,210	
Roofing tile—									
Value.....	\$7,000			\$66,045		\$54,675	\$1,000		
Floor tile—									
Value.....			\$37,123	\$25,600		\$510,419			
Encaustic tile—									
Value.....								\$16,588	
Fire brick—									
Number of 1,000.....	26,502	1,810	40,281	11,649	238	69,129	60	558,016	960
Value.....	\$375,023	\$72,088	\$633,158	\$227,814	\$3,380	\$976,693	\$1,300	\$4,921,339	\$11,220
Glass-melting pots—									
Value.....	\$3,151		\$12,000			\$136,620		\$205,210	
Fire-clay retorts—									
Value.....	\$52,560		\$77,666	\$4,750		\$33,509		\$11,400	
Furnace linings and settings—									
Value.....	\$96,155		\$70,000	\$30,652		\$134,587		\$190,822	
Locomotive tiles and tank blocks—									
Value.....	\$184,085		\$46,500	\$19,997		\$20,956		\$132,653	
Stove linings—									
Value.....	\$10,000	\$250	\$8,000	\$74,507		\$7,563		\$106,851	
Saggers—									
Value.....			\$5,595	\$45,786		\$24,014	\$60	\$3,228	
Clay crucibles, muffles, and scorifiers—									
Value.....			\$2,800	\$12,000				\$1,455	
Flue linings—									
Value.....	\$6,540		\$91,730	\$10,480	\$1,000	\$83,119	\$600	\$10,535	
Drain tile—									
Value.....	\$18,829		\$6,360	\$14,716	\$3,075	\$131,852	\$2,000	\$13,180	
Sewer pipe—									
Tons.....	83,363	5,333	27,350	11,289	10,857	466,469	12,200	34,435	
Value.....	\$436,624	\$25,000	\$90,000	\$51,293	\$38,000	\$1,680,724	\$36,700	\$204,400	
Electrical conduits—									
Value.....	\$2,000		\$250,006	\$20,000		\$315,305			
Enameled brick—									
Number of 1,000.....			3,336				2	983	
Value.....			\$183,113				\$120	\$74,375	
Vitrified paving brick—									
Number of 1,000.....	15	85	210	11,467		26,853		15,862	
Value.....	\$172	\$1,445	\$2,687	\$118,172		\$208,924		\$134,065	
Ornamental-shaped brick (all not rectangular, plain brick)—									
Number of 1,000.....		16	425	2,235		60	5	114	
Value.....		\$330	\$17,750	\$75,280		\$1,200	\$275	\$3,200	
Fancy colored front brick (all except red)—									
Number of 1,000.....	2		7,953	100		1,057	450	7,131	
Value.....	\$68		\$162,035	\$1,000		\$12,100	\$16,000	\$85,539	
Red front brick (both pressed and wire-cut)—									
Number of 1,000.....		124	407	2,628		2,257	13	200	
Value.....		\$1,403	\$4,784	\$25,544		\$17,575	\$420	\$2,500	
Common brick—									
Number of 1,000.....	90	8,465	93,763	13,698	3,500	15,939	480	13,058	
Value.....	\$701	\$55,079	\$454,174	\$75,114	\$17,500	\$77,338	\$2,465	\$77,449	
All other terra cotta, fire, and other clay products ² —									
Value.....	\$126,752	\$21,383	\$166,081	\$82,307	\$150	\$40,880	\$148	\$392,517	
All other products.....	\$53,471	\$928	\$226,147	\$57,499	\$700	\$12,805		\$79,582	\$2,500
Power:									
Number of establishments reporting.....	25	5	73	42	3	239	4	124	8
Total horsepower owned.....	2,861	521	9,525	5,560	293	20,501	352	16,567	114
Engines—									
Steam—									
Number.....	44	8	121	55	3	290	5	202	1
Horsepower.....	2,799	426	8,489	5,425	275	19,579	352	15,890	50
Gas or gasoline—									
Number.....	1			5		8		5	
Horsepower.....	6			132		276		157	
Water wheels—									
Number.....					1	1			2
Horsepower.....					18	180			64
Electric motors—									
Number.....	5	2	17	1		25		11	
Horsepower.....	56	95	545	2		450		510	
Other power—									
Number.....			12			1		1	
Horsepower.....			491			16		10	
Machinery and kilns:									
Pottery—									
Disintegrators (blunger).....			88	11		154	1	35	1
Agitators.....			79	10		178		17	1
Slip pumps.....	8		79	19		163	1	33	1
Lawns.....			55	15		99		26	1
Clay presses:									
Iron.....	2	1	78	22		175	1	33	8
Wood.....	5		45			5		7	

¹The report for the Twelfth Census is for the calendar year 1899.

²Including acid-proof brick, adobes, aquaria ornaments, condensers, cupola blocks, fire kindlers, gas logs, glass-house furnace blocks, grate tile, grave markers, hollow brick, lead pots, open-hearth runner brick, patent panels, perforated paving brick, porous cups, porous hollow brick, sewer brick, sidewalk tile and blocks, statuary, stone pumps, toy marbles, vases, web tile, and well brick and tile.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900¹—Continued.

	Missouri.	Montana.	New Jersey.	New York.	North Carolina.	Ohio.	Oregon.	Pennsylvania.	South Carolina.
Machinery and kilns—Continued.									
Pottery—Continued.									
Pug mills—									
Regular	8	1	67	16	3	122	2	55	6
Sagger			33	6	1	52		8	
Wad mills	1		39	5	0	71		11	
Jiggers	7		138	75		630	2	96	2
Batters	3		380	8		30		70	
Dry presses			88	52		32		21	
Polishers	2		14	1		32		1	
Lathes	9		89	50	10	138	3	37	7
All other machines	6		110	16		188	4	41	2
Kilns—									
Up-draft	14		192	24	13	318	1	107	
Down-draft	4	1	44	34	15	291	3	49	2
Muffle									
Large	2		27	1		18		9	2
Decorating			57	9		137		27	
All other			6	8	2	15		7	2
Terra cotta, tile, and brick—									
Clay-grinding machines—									
Disintegrators	9	6	33	20	2	36	2	28	
Dry pans	34	2	31	19	2	128	1	94	3
All other	10	7	27	9	1	49	1	11	2
Clay-tempering machines—									
Ring pits	1	1	39	5	2	11		9	
Pug mills	27	12	66	34		63	4	88	
Wet pans	27	5	36	3	8	117	1	127	
All other	5	4	6	2	1	23		2	
Molding machines—									
Soft mud		12	53	8	1	21		15	
Stiff mud	5	1	33	14	1	37	1	34	
Dry presses	2	3	16	11		27	1	12	
Shape brick power presses			16	7	1	11		45	
Hand presses	36	9	122	37	2	77	1	341	2
Sewer-pipe presses	9	1	9	6	2	75	2	15	
Tile machines	11	4	25	10	1	66	2	19	
All other	1	10	507	51	1	31		775	
Mold sanders		10	14	8		2		16	
All other machines	12	2	5	184		10	2	18	
Kilns:									
Clamp	10	5	62	10	5	11	1	19	2
Down-draft—									
Round	123	13	173	93		715	12	136	
Rectangular	27		42	21		111	2	491	
Muffle	19	1	39	9		5		21	
Continuous	2	1	5	2					
All other kilns	7	14	23	11		42		105	2
Dryers	59	23	119	45	7	142	3	135	2
Idle machinery	6	4	46	33	1	39	1	36	
Establishments, classified by number of persons employed, not including proprietors and firm members:									
Total number of establishments	37	5	31	52	21	248	5	143	10
No employees			2	1		3		6	
Under 5	14		5	9	15	32	2	16	4
5 to 20	9	1	17	6	4	74	1	29	5
21 to 50	4	3	15	16		43	2	38	1
51 to 100	3		11	9	2	48		26	
101 to 250	4	1	22	10		41		20	
251 to 500	3		3	1		5		6	
501 to 1,000			3			2		2	
Over 1,000			1			1		1	

	Tennessee.	Texas.	Utah.	Virginia.	Washington.	West Virginia.	Wisconsin.	All other states. ²
Number of establishments	18	28	7	5	8	14	4	8
Character of organization—								
Individual	10	24	5	1	1	4	2	4
Firm and limited partnership	4	3	1	2	4	3	2	3
Incorporated company	4	1	1	2	3	7		1
Miscellaneous								
Capital:								
Total	\$171,898	\$203,395	\$38,050	\$309,361	\$426,560	\$1,610,266	\$23,349	\$156,725
Land	\$17,085	\$36,216	\$8,100	\$12,620	\$52,329	\$230,517	\$6,500	\$14,800
Buildings	\$57,220	\$95,743	\$10,500	\$139,239	\$195,398	\$584,345	\$5,700	\$58,500
Machinery, tools, and implements	\$40,255	\$29,956	\$11,800	\$82,571	\$77,726	\$289,964	\$5,050	\$37,125
Cash and sundries	\$57,388	\$41,480	\$7,650	\$74,931	\$111,107	\$505,440	\$5,499	\$51,000
Proprietors and firm members	15	31	8	6	8	13	9	8
Salaried officials, clerks, etc.:								
Total number	15	7	2	10	15	57		14
Total salaries	\$11,755	\$6,900	\$2,000	\$13,384	\$17,900	\$51,592		\$15,575
Officers of corporations—								
Number	4	1	2	2	4	6		4
Salaries	\$3,000	\$2,000	\$2,000	\$6,000	\$7,200	\$18,200		\$3,700
General superintendents, managers, clerks, etc.—								
Total number	11	6		8	11	51		10
Total salaries	\$8,755	\$4,900		\$7,384	\$10,700	\$33,392		\$11,875
Men—								
Number	11	6		7	11	47		10
Salaries	\$8,755	\$4,900		\$6,760	\$10,700	\$31,352		\$11,875
Women—								
Number				1		4		
Salaries				\$624		\$2,040		
Wage-earners, including pieceworkers, and total wages:								
Greatest number employed at any one time during the year	389	411	56	144	168	1,688	17	150
Least number employed at any one time during the year	281	184	41	51	102	992	8	139

¹ The report for the Twelfth Census is for the calendar year 1899.

² Includes establishments distributed as follows: Florida, 1; Idaho, 1; Nebraska, 1; New Hampshire, 2; New Mexico, 1; North Dakota, 1; Vermont, 1.

CLAY PRODUCTS.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900¹—Continued.

	Tennessee.	Texas.	Utah.	Virginia.	Washington.	West Virginia.	Wisconsin.	All other states. ²
Wage-earners, including pieceworkers, and total wages—Continued.								
Average number.....	300	280	86	100	126	1,269	10	108
Wages.....	\$91,417	\$77,423	\$10,906	\$23,892	\$59,928	\$500,444	\$3,739	\$42,150
Men, 16 years and over—								
Average number.....	291	279	35	90	124	975	8	100
Wages.....	\$90,696	\$77,324	\$10,750	\$22,006	\$59,612	\$429,434	\$3,164	\$39,950
Women, 16 years and over—								
Average number.....				2		263		
Wages.....				567		64,949		
Children, under 16 years—								
Average number.....	9	1	1	8	2	31	2	8
Wages.....	\$721	\$99	\$156	\$1,319	\$316	\$6,061	\$575	\$2,200
Average number of wage-earners, including pieceworkers, employed during each month:								
Men, 16 years and over—								
January.....	236	162	21	50	108	719	10	39
February.....	243	197	21	47	107	687	10	39
March.....	275	225	26	80	129	769	10	106
April.....	298	251	33	80	133	955	9	128
May.....	303	337	45	93	137	1,037	9	131
June.....	306	349	53	107	127	951	7	131
July.....	320	375	48	104	121	1,074	3	126
August.....	324	366	44	112	140	1,195	2	126
September.....	296	335	44	107	135	1,157	9	129
October.....	310	315	33	106	116	1,061	10	131
November.....	230	227	25	99	115	1,035	9	69
December.....	286	210	21	99	119	1,065	8	49
Women, 16 years and over—								
January.....				1		261		
February.....						261		
March.....				1		261		
April.....				3		263		
May.....				1		263		
June.....						263		
July.....						263		
August.....						263		
September.....				1		263		
October.....				6		263		
November.....				6		263		
December.....				6		263		
Children, under 16 years—								
January.....	4		1	3	2	16	3	8
February.....	2		1	2	1	20	3	8
March.....	6	1	1	10	1	23	3	8
April.....	9	2	1	8	1	34	3	8
May.....	12	2	1	11		35	3	8
June.....	10	1	1	6	3	29		8
July.....	10	1	1	6	1	25		8
August.....	12	1	1	10	3	40		8
September.....	11	1	1	8	3	42	1	8
October.....	12	1	1	11	2	38	1	8
November.....	10		1	8	2	36	3	8
December.....	11		1	8	1	33	3	8
Miscellaneous expenses:								
Total.....	\$50,332	\$12,294	\$1,214	\$12,111	\$7,599	\$114,834	\$635	\$5,033
Rent of works.....	\$100	\$580	\$590		\$225	\$3,254		
Taxes, not including internal revenue.....	\$1,276	\$1,043	\$467	\$357	\$2,156	\$7,014	\$170	\$630
Rent of offices, interest, insurance, and all sundry expenses not hitherto included.....	\$49,456	\$10,401	\$157	\$11,254	\$5,218	\$104,566	\$465	\$5,003
Contract work.....		\$270						
Materials used:								
Total cost.....	\$74,244	\$43,876	\$6,196	\$34,455	\$29,392	\$219,134	\$1,277	\$32,969
China clay (domestic)—								
Tons.....						724		10
Cost.....						\$7,276		\$155
China clay (foreign)—								
Tons.....						1,131		10
Cost.....						\$16,641		\$172
Ball clay (domestic)—								
Tons.....		225				1,220		5
Cost.....		\$1,200				\$9,764		\$50
Ball clay (foreign)—								
Tons.....						188		12
Cost.....						\$1,870		\$135
Stoneware clay—								
Tons.....	4,311	3,334		20	1,147	235		170
Cost.....	\$5,053	\$4,190		\$20	\$2,855	\$300		\$340
Slip clay—								
Tons.....	76	109		1	8	11		8
Cost.....	\$234	\$1,119		\$4	\$91	\$120		\$40
Fire clay—								
Tons.....	1,970	650	750	225	26	361		2,215
Cost.....	\$7,880	\$678	\$750	\$225	\$21	\$462		\$7,775
Pipe clay—								
Tons.....	10,445		500	402				
Cost.....	\$10,447		\$500	\$404				
Terra cotta clay—								
Tons.....						232		
Cost.....						\$116		
Brick clay, purchased—								
Tons.....		35		3,208	11	1,399		
Cost.....		\$35		\$4,432	\$6	\$139		
All other clay—								
Tons.....	250		112	40		20		
Cost.....	\$252		\$434	\$60		\$54		
Coal, used as an ingredient—								
Tons.....	178							
Cost.....	\$207							
Sand—								
Tons.....	171	75	18		51	717		50
Cost.....	\$173	\$35	\$18		\$41	\$304		\$63

¹The report for the Twelfth Census is for the calendar year 1899.

²Includes establishments distributed as follows: Florida, 1; Idaho, 1; Nebraska, 1; New Hampshire, 2; New Mexico, 1; North Dakota, 1; Vermont, 1.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900¹—Continued.

	Tennessee.	Texas.	Utah.	Virginia.	Washington.	West Virginia.	Wisconsin.	All other states. ²
Materials used—Continued.								
Total cost—Continued.								
Manganese—								
Pounds		2,500	800	68,040				100
Cost		\$118	\$32	\$858				\$5
Salt—								
Tons	106	84			1	3		1
Cost	\$544	\$704			\$13	\$9		\$10
Iron—								
Pounds								24,000
Cost								\$25
Coloring matter—								\$40
Carbonate of barium								
Sawdust		\$20						
Flint (quartz)—								
Tons	19	7				1,850		110
Cost	\$147	\$60				\$12,235		\$375
Feldspar—								
Tons	16	21				880		105
Cost	\$250	\$314				\$7,535		\$1,025
Plaster—								
Tons	4	36			25	152		3
Cost	\$30	\$397			\$177	\$1,932		\$30
Liquid and coin gold						\$5,700		\$400
Oxide of lead, zinc, and cobalt	\$41	\$99	\$300	\$65	\$15	\$6,063		\$260
Packing materials (crates, hogsheads, barrels, boxes, straw, etc.)	\$1,442	\$902	\$25	\$1,419	\$180	\$14,204		\$5,404
Fuel	\$85,830	\$28,845	\$2,404	\$12,015	\$15,097	\$100,446	\$695	\$11,880
Rent of power and heat						\$248		
Mill supplies	\$5,602	\$2,686	\$129	\$1,028	\$1,055	\$8,634	\$39	\$1,540
All other materials	\$1,528	\$691	\$4	\$1,198	\$107	\$353	\$118	\$545
Freight	\$4,519	\$1,883	\$1,000	\$12,727	\$9,618	\$24,235	\$425	\$3,200
Products:								
Aggregate value	\$259,710	\$192,061	\$28,600	\$83,178	\$157,304	\$1,104,833	\$14,213	\$130,075
Pottery—								
Total value	\$67,920	\$81,507	\$7,700	\$9,105	\$13,350	\$585,310	\$13,145	\$24,625
Red earthenware—								
Value		\$5,860	\$7,500	\$745			\$13,145	
Stoneware—								
Gallons	1,435,200	1,432,400			197,500	316,000		
Value	\$66,920	\$87,647			\$13,350	\$16,464		
Art pottery and porcelain—								
Value	\$1,000	\$8,000	\$200	\$8,360		\$568,846		\$24,625
All other pottery products—								
Value								
Terra cotta, fire, and other clay products—								
Total value	\$191,790	\$110,084	\$14,900	\$74,073	\$143,954	\$519,323	\$640	\$103,450
Architectural terra cotta—								
Value					\$9,300			\$50
Chimney tops—								
Value		\$300	\$500		\$300			
Fireproofing, including terra cotta, lumber, and hollow building tile or blocks—								
Tons		280			229	8		
Value		\$2,802			\$2,152	\$78		
Roofing tile—								
Value						\$22,632		
Floor tile—								
Value								
Encaustic tile—								
Value								
Fire brick—								
Number of 1,000	2,744	1,401	164	50	533	4,600		1,400
Value	\$23,049	\$23,234	\$3,250	\$937	\$16,053	\$54,400		\$36,000
Glass-melting pots—								
Value								
Fire-clay retorts—								
Value								
Furnace linings and settings—								
Value								
Locomotive tiles and tank blocks—								
Value								
Stove linings—								
Value								\$30,000
Saggers—								
Value								
Clay crucibles, muffles, and scorifiers—								
Value					\$500			
Flue linings—								
Value	\$4,497				\$924	\$10,000		
Drain tile—								
Value	\$5,095	\$325	\$400	\$660	\$4,521		\$640	\$1,000
Sewer pipe—								
Tons	35,749	15,200	4,000		11,818	17,071		142
Value	\$142,999	\$58,753	\$3,000		\$76,694	\$42,350		\$500
Electrical conduits—								
Value								
Enameled brick—								
Number of 1,000								
Value								
Vitrified paving brick—								
Number of 1,000						297	46,301	
Value						\$5,940	\$359,716	
Ornamental-shaped brick (all not rectangular, plain brick)—								
Number of 1,000		12				15		
Value		\$240				1,050		
Fancy colored front brick (all except red)—								
Number of 1,000								200
Value								\$3,000

¹ The report for the Twelfth Census is for the calendar year 1899.² Includes establishments distributed as follows: Florida, 1; Idaho, 1; Nebraska, 1; New Hampshire, 2; New Mexico, 1; North Dakota, 1; Vermont, 1.

CLAY PRODUCTS.

TABLE 18.—POTTERY, TERRA COTTA, AND FIRE-CLAY PRODUCTS, BY STATES AND TERRITORIES: 1900¹—Continued.

	Tennessee.	Texas.	Utah.	Virginia.	Washington.	West Virginia.	Wisconsin.	All other states. ²
Products—Continued.								
Aggregate value—Continued.								
Terra cotta, etc.—Continued.								
Total value—Continued.								
Red front brick (both pressed and wire-cut)—								
Number of 1,000.....		50		80		653		1,550
Value.....		\$800		\$800		\$4,497		\$19,400
Common brick—								
Number of 1,000.....	1,870	4,360	500	800		2,500		1,500
Value.....	\$11,160	\$20,380	\$2,750	\$4,000		\$12,500		\$13,500
All other terra cotta, fire, and other clay products: ³								
Value.....		\$3,750		\$3,540	\$6,940	\$9,800		
All other products.....		\$520	\$6,000			\$250	\$428	\$2,000
Power:								
Number of establishments reporting.....	8	9	3	3	3	12	2	7
Total horsepower owned.....	577	370	150	395	155	1,837	45	416
Engines—								
Steam—								
Number.....	9	9	3	4	3	24	2	9
Horsepower.....	577	370		395	155	1,837	45	416
Gas or gasoline—								
Number.....			150					
Horsepower.....								
Water wheels—								
Number.....								
Horsepower.....								
Electric motors—								
Number.....								
Horsepower.....								
Other power—								
Number.....								
Horsepower.....								
Machinery and kilns:								
Pottery—								
Disintegrators (blunger).....	5		1	1	1	8	3	2
Agitators.....			1			6		
Slip pumps.....	11	6			1	10		3
Lawns.....	1		2			5		1
Clay presses—								
Iron.....	3	2				11	1	
Wood.....								1
Pug mills—								
Regular.....	9	17	1		2	6	3	3
Sagger.....						3		1
Wad mills.....	1	1		1		3		1
Jiggers.....	11	7	1	4	2	22	3	6
Butters.....			2					
Dry presses.....								
Polishers.....		1				1		
Lathes.....	11	14	1	1	3	8		2
All other machines.....	11	6	2	7	2	1		1
Kilns—								
Up-draft.....	12	19	2	3	3	26		3
Down-draft.....	9	8	4		3	11	1	3
Muffle—								1
Large.....						20		1
Decorating.....						1	2	
All other.....		2	1		1			
Terra cotta, tile, and brick								
Clay-grinding machines:								
Disintegrators.....		2	1	2	1	2		4
Dry pans.....	3	2	1	3	2	9		1
All other clay-grinding machines.....	1	7		2	4		1	5
Clay-tempering machines—								
Ring pits.....	5	5						5
Pug mills.....	4	4	8	3	2	8		
Wet pans.....	5	1	1	4		3		
All other.....	1				1	1		
Molding machines—								
Soft mud.....		1	2		2	6		1
Stiff mud.....	2	1	1	2	1	14		2
Dry presses.....					5	4		1
Shape-brick power presses.....	3				1	17		
Hand presses.....	5	4	1	16	7	8		3
Sewer-pipe presses.....	4	2		1	2	4		
Tile machines.....	2	3	2	2	2	10	1	
All other.....		7			1			2
Mold sanders.....						1		1
All other machines.....						1		
Kilns—								
Clamp.....	2	4	3		2	14		1
Down-draft—								
Round.....	31	17		3	18	110	1	3
Rectangular.....			1	6	1	9		6
Muffle.....				3	1			
Continuous.....						1		
All other.....				1		10		2
Drivers.....	4	2		3	9	16	1	4
Idle machinery.....	4	1	1	5	5			1
Establishments, classified by number of persons employed, not including proprietors and firm members:								
Total number of establishments.....	18	28	7	5	8	14	4	8
No employees.....								
Under 5.....	3	8	2	1	1	1	3	2
5 to 20.....	10	17	4		4	5	1	3
21 to 50.....	4	2	1	2	2	1		2
51 to 100.....					1	2		1
101 to 250.....						2		
251 to 500.....						2		
501 to 1,000.....						1		
Over 1,000.....								

¹The report for the Twelfth Census is for the calendar year 1899.

²Includes establishments distributed as follows: Florida, 1; Idaho, 1; Nebraska, 1; New Hampshire, 2; New Mexico, 1; North Dakota, 1; Vermont, 1.

³Including acid-proof brick, adobes, aquaria ornaments, condensors, cupola blocks, fire kindlers, gas logs, glass-house furnace blocks, grate tile, grave markers, hollow brick, lead pots, open-hearth runner brick, patent panels, perforated paving brick, porous cups, porous hollow brick, sewer brick, sidewalk tile and blocks, statuary, stone pumps, toy marbles, vases, web tile, and well brick and tile.

GLASS.

(947)

GLASS.

By SHIRLEY P. AUSTIN, *Expert Special Agent.*

The manufacture of glass in this country dates almost from the arrival of the first English colonists in what is now the United States. One of the earliest attempts, if not the first, at manufacturing in the original thirteen colonies was directed toward the production of glass, and a glass works erected for that purpose in 1608 or 1609, and located about a mile from Jamestown, Va., was probably the first manufactory erected in America by the English colonists. In 1608 the London Company sent glassworkers to America to operate the plant, and in the following year some of the products constituted a part of the first cargo of goods exported from this country.¹ This first glass factory probably produced bottles exclusively. Its career was brief, as in 1617 it was reported fallen into decay, and later was swept entirely away in the Indian massacre of 1622. In 1620 a subscription list was started in Jamestown to erect a factory for the manufacture of glass beads, the currency among the Indians, and in 1621 the London Company sent Italian workmen for this plant, which seems to have been located some distance from Jamestown, as it escaped the massacre of 1622, and is referred to as late as 1623. In 1639 a glass factory was located at Salem, Mass., and previous to this, although the exact date is not known, glass was first made in New York on Manhattan Island.² The first mention of a glass factory in Pennsylvania is contained in a very vague reference in a letter written by William Penn in 1683. The progress of the industry during the colonial period was slow and financial reverses were the rule. The scarcity of glass during the Revolutionary War stimulated factory erection, and early in the Nineteenth century the industry assumed much prominence, being confined largely to Massachusetts, New York, eastern Pennsylvania, New Jersey, and Maryland. These early factories were usually situated within easy access to forests, from which

the fuel supply was obtained. Not until the erection of the first factory west of the Allegheny Mountains, at Pittsburg in 1797, was coal used as a fuel in glass manufacture, and it was many years before it came into general use.³ The Atlantic seaboard long held supremacy in the manufacture of glass, but with the westward spread of population and the discovery of rich fuel resources in western Pennsylvania, West Virginia, Ohio, and Indiana, the center of the industry has steadily moved westward and the bulk of the production has been for some time west of the Alleghenies.

This report, with the statistical tables accompanying it, includes only establishments manufacturing glass from the crude material and does not include the large number of separate establishments engaged in the reworking of glass, such as silvering, beveling, cutting, engraving, decorating, etc. A number of the glass establishments, however, carry on these processes in direct connection with the manufacture of the "metal" in the same factory, and such establishments are included.

The inquiry into glass manufacture for this census was based on the following classification of the industry: (1) Building glass, all establishments making common window glass, plate glass, and all varieties of cast and rolled sheet glass; (2) pressed and blown glass, all establishments manufacturing pressed or blown flint glassware, tableware, jellies, tumblers, goblets, lamps, chimneys, lantern globes, gas and electric lighting ware, stem ware, opal ware, cut glass, etc.; (3) bottles and jars, all establishments manufacturing bottles and jars in flint, green, or amber glass. It has been found necessary to combine the last two divisions, as several firms reported production in both these branches.

Table 1 is a comparative summary of the statistics for the industry as returned at the censuses of 1850 to 1900, inclusive, with the percentages of increase for each decade.

¹Stith's History of Virginia, pages 77 and 82.

²Bishop's History of American Manufactures, Vol. I, pages 233 and 234.

³History of Pittsburg, by Neville B. Craig, 1851, pages 276 and 277.

TABLE 1.—COMPARATIVE SUMMARY, 1850 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	DATE OF CENSUS.						PER CENT OF INCREASE.				
	1900	1890	1880	1870	1860	1850	1890 to 1900	1880 to 1890	1870 to 1880	1860 to 1870	1850 to 1860
Number of establishments.....	355	294	169	201	112	94	20.7	74.0	115.9	79.5	19.1
Capital.....	\$61,423,903	\$40,966,850	\$18,804,599	\$14,111,642	\$6,133,666	\$3,402,350	49.9	117.9	33.3	130.1	80.3
Salaries officials, clerks, etc., number.....	2,268	2,105	(³)	(³)	(³)	(³)	107.1	.....	.....	.....	.....
Salaries.....	\$2,792,376	\$2,232,561	(³)	(³)	(³)	(³)	126.6	.....	.....	.....	.....
Wage-earners, average number.....	52,818	44,892	24,177	15,822	9,016	5,668	17.7	85.7	62.8	75.5	69.1
Total wages.....	\$27,084,710	\$20,885,961	\$9,144,100	\$7,846,425	\$2,903,832	\$2,094,576	29.7	123.4	16.5	170.2	38.6
Men, 16 years and over.....	42,173	36,064	17,778	11,505	8,765	5,571	16.9	102.9	54.5	81.3	57.3
Wages.....	\$24,901,233	\$19,546,351	(³)	(³)	(³)	(³)	27.4	.....	.....	.....	.....
Women, 16 years and over.....	3,529	1,885	741	715	251	97	87.2	154.4	8.6	184.9	158.8
Wages.....	\$840,001	\$332,245	(³)	(³)	(³)	(³)	152.8	.....	.....	.....	.....
Children, under 16 years.....	7,116	6,943	5,658	3,602	(³)	(³)	2.5	22.7	57.1	.....	.....
Wages.....	\$1,343,476	\$1,007,365	(³)	(³)	(³)	(³)	33.4	.....	.....	.....	.....
Miscellaneous expenses.....	\$3,588,641	\$2,267,696	(⁴)	(⁴)	(⁴)	(⁴)	58.3	.....	.....	.....	.....
Cost of materials used.....	\$16,731,009	\$12,140,985	\$8,028,621	\$6,133,168	\$2,914,803	\$1,556,833	37.8	51.2	30.9	110.5	87.2
Value of products.....	\$56,539,712	\$41,051,004	\$21,154,571	\$19,235,832	\$8,775,155	\$4,641,676	37.7	94.1	10.0	119.2	89.1

¹ Decrease. ² Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See Table 12.)

³ Not reported separately.

⁴ Not reported.

The remarkable growth of the glass making industry in the last half century is shown in Table 1. With the exception of a decrease in the number of establishments between 1870 and 1880, the table shows a steady increase in every item from 1850 to 1900. From 1850 to 1900 the number of establishments increased 261, or 277.7 per cent. The great improvement in factory construction and equipment and the broadening of the scope of the business during the same period are indicated by the increase in capital from \$3,402,350 in 1850 to \$61,423,903 in 1900, or 1,705.3 per cent. The number of wage-earners has increased from 5,668 in 1850 to 52,818 in 1900, or 831.9 per cent; and wages paid, from \$2,094,576 in 1850 to \$27,084,710 in 1900, or 1,193.1 per cent. During the same period the cost of materials used has increased from \$1,556,833 to \$16,731,009, or 974.7 per cent; and the value of products, from \$4,641,676 to \$56,539,712, or 1,118.1 per cent.

The growth from 1890 to 1900 was vigorous, as shown by an increase of 20.7 per cent in number of active establishments, and of 49.9 per cent in capital invested. The increase in capital was largely caused by the general introduction during the decade of the tank melting furnace, which necessitates much more costly and permanent factory construction and equipment than the pot furnace, which it is fast supplanting.

Of the total cost of materials used in 1900, \$16,731,009, the principal item was the cost of packages and package materials, which was \$3,390,627, and in 1890 was \$1,853,462, an increase of \$1,537,165, or 82.9 per cent. This large increase was caused in part by the demand for a neater package for finished products in nearly all lines of glass manufacture, created by increased competition, and by the more general use of the carton package for lamp chimneys, shades, globes, and the great variety of high-grade glassware, and the increased use of paper between sheets in packing building glass. In addition to the above package materials, establishments manufacturing pressed and blown ware, bottles, and jars reported in 1900, \$1,522,917 as the cost of caps, metal trimmings, and rubber supplies. The cost of

these materials was not reported separately at the census of 1890, but there has been an enormous increase in their consumption.

The total cost of fuel in 1900 was reported as \$3,203,146. Of this amount, natural gas cost \$1,575,278; coal, \$1,074,074; and oil, \$409,158; the remainder being divided between coke and wood. A number of establishments, particularly in Indiana, reported little or no cost for fuel, as they were either getting "free gas" as an inducement for location, or owned the source of their supply, and reported the small cost of maintenance under the item of general expense. Hence there was a large amount of natural gas used as fuel which was not reported.

Soda ash is the third largest item of cost in materials used, 157,779 tons being reported, at a cost of \$2,259,939. In 1890, 96,777 tons were reported, costing \$3,108,233. The average cost per ton in 1900 was \$14.32, and in 1890, \$32.12. While the quantity of soda ash used in glass manufacture during the decade increased 63 per cent, the cost decreased 27.3 per cent. The comparison shows the benefits derived by the glass industry from the development of the American soda-ash manufacture in the last ten years, a development that received the greater share of its impetus from men actively connected with the glass industry.

The increase in the value of products between 1890 and 1900 was 37.7 per cent, but it is safe to say the increase in the quantity of products was in excess of that, especially in the output of bottles, jars, and glassware, owing to the general introduction of the tank melting furnace and the adoption of improved mechanical equipment. The number of pieces of glassware, bottles, jars, etc., manufactured, was not reported at the census of 1890. It is therefore impossible to make a comparison with such data at the present census. The total production of plate glass, rough and polished, in 1890, was 12,206,942 square feet; and in 1900, 17,512,262 square feet, an increase of 43.5 per cent. There were 2,773,824 square feet of cathedral glass manufactured in 1890, and 8,846,361 square feet in 1900, or an

increase of 218.9 per cent. The quantities of skylight and wire glass manufactured in 1900 were 3,679,694, and 1,295,504 square feet, respectively. No report was made of these products at the census of 1890. In 1890 there were 3,768,884 boxes of window glass manufactured, and 4,341,282 boxes in 1900, an increase of only 15.2 per cent. The comparatively small increase is explained by the much shorter "run" of factories

during the "fire" covered by the present census, the average "run" being about six months in 1900 and nearly ten months in 1890. In addition, a large percentage of the available capacity of the factories was idle in 1900 for want of workmen.

Table 2 shows the idle establishments, by states, with the capital invested and the equipment of the factories, for 1900.

TABLE 2.—IDLE ESTABLISHMENTS, BY STATES: 1900.

	United States.	Illinois.	Indiana.	Kentucky.	New Jersey.	New York.	Ohio.	Pennsylvania.	Washington.	West Virginia.
Number of establishments	60	6	7	2	8	4	8	19	1	5
Capital	\$3,544,536	\$258,000	\$121,085	\$70,581	\$84,700	\$337,900	\$308,018	\$1,968,682	\$60,000	\$335,720
Equipment and character of works:										
Furnaces, number	41	8			6		8	13		6
Pots, number	488	140			42		87	166		68
Tanks—										
Continuous, number	27	1	6		3	4	2	10		1
Rings, number	248	6	46		29	52	15	90		10
Pot capacity, number	692	18	92		82	132	30	218		20
Intermittent or day, number	16		3	3	1		2	4	1	12
Pot capacity, number	139		41	18	36		4	18	10	12
Flattening ovens, number	88	2			11	10		14		1
Monkey ovens, number	32						80	2		
Blow furnaces, number	20				2	4		12		2
Casting tables, number	6	3						3		
Annealing ovens, number	67	4	12	29	4			16		2
Bending ovens, number	3							2		1
Clay grinding mills, number	2							2		
Grinding machines, number	13				3		6	5		
Polishing machines, number	3				2			1		
Shops, number	167	15	51	11	6	26	16	43		6
Glory holes, number	118	8	16	6	1	4	22	56		23
Lehrs, number	153	8	14		12	20	29	47		10
Decorating kilns, number	11						1			
Decorating lehrs, number	2						1			
Hand presses, number	56			5			3	29		19
Mechanical presses, number	12							7		5
Blowing machines, number	10					10				
Finishing machines, number	15							13		2
Crimping machines, number	16							6		
Sand-blast machines, number	3							1		2
Grinding machines for fruit-jar tops, number	4		1					3		

In addition to the 355 active establishments reported in 1900, Table 2 shows that 60 establishments, with a capital of \$3,544,536, were reported as idle during the census year. These establishments were located as follows, by states: Illinois, 6; Indiana, 7; Kentucky, 2; New Jersey, 8; New York, 4; Ohio, 8; Pennsylvania, 19; Washington, 1; West Virginia, 5. Only those idle establishments that seemed reasonably certain of being again put in operation in the near future are included in Table 2. No account was taken of the many dismantled and abandoned glass factories in the country.

Of the 60 idle establishments reported, 41, with a capital of \$2,296,587, were for the manufacture of pressed and blown ware or bottles and jars. The equipment of these establishments was as follows: 22 furnaces of 257 pots; 19 continuous tanks of 152 rings, or 304 pots capacity; 11 intermittent or day tanks of 120 pots capacity; 118 glory holes; 61 annealing ovens; 117 lehrs; 11 decorating kilns; 2 decorating lehrs; 56 hand presses; 12 mechanical presses; 10 blowing machines; 15 finishing machines; 16 crimping machines; 3 sand-blast machines; and 4 machines for grinding fruit jar tops. The remaining 19 idle establishments were building-glass factories, which reported a total capital of \$1,247,949, and the following equipment: 19 furnaces of 231 pots; 8 continuous tanks of 96 rings or 288 pots

capacity; 5 day tanks of 19 pots capacity; 38 flattening ovens; 32 monkey ovens; 20 blow furnaces; 6 casting tables; 6 annealing ovens; 3 bending ovens; 36 lehrs; 13 grinding machines; 3 polishing machines; and 2 clay grinding mills.

In addition to the establishments that were idle throughout the census year, a certain portion of the furnace equipment of active establishments was reported as idle. In active building glass factories, 29 pot furnaces with 471 pots, and one intermittent or day tank furnace of 7 pots capacity were reported as idle. In active pressed and blown ware and bottle and jar factories, 31 pot furnaces with 336 pots, 14 continuous tank furnaces with 79 rings of 158 pots capacity, and 16 intermittent or day tank furnaces of 76 pots capacity were reported as idle. The entire idle furnace equipment of active establishments in both branches of glass manufacture was as follows: 60 pot furnaces with 807 pots, 14 continuous tank furnaces with 79 rings of 158 pots capacity, and 17 intermittent or day tank furnaces of 83 pots capacity. It should be stated in this connection that this idle equipment is included in all tables presenting such data in this report, except Table 2. Adding the statistics of active establishments to those shown in Table 2 gives a total of 415 active and idle establishments in the United States, with a capital of

\$64,968,439. The combined equipment of all establishments is as follows: Furnaces, 492; pots, 5,595; continuous tanks, 233; pot capacity of continuous tanks, 4,525; intermittent or day tanks, 163; pot capacity of intermittent or day tanks, 1,040; flattening ovens, 323; monkey ovens, 34; blow furnaces, 279; casting tables, 106; annealing ovens, 936; bending ovens, 12; clay grinding mills, 73; grinding machines, 240; polishing machines, 297; shops, 4,145; glory holes, 1,537; lehrs, 1,480; decorating kilns, 116; decorating lehrs, 25; hand presses, 971; mechanical presses, 61; blowing machines, 179; finishing machines, 155; crimping machines, 510; mechanical polishers, 16; sand-blast machines, 76; grinding machines for fruit jar tops, 141.

Table 3 presents the value of new construction, by states, during the census year. Only the value of additions to existing factories is given in the table, not including ordinary repairs and the value of new plants constructed.

TABLE 3.—NEW CONSTRUCTION, BY STATES: 1900.

STATES.	Cost of new construction (additions to old works, not including ordinary repairs) during census year.
United States	\$578,917
Georgia.....	2,500
Illinois.....	43,448
Indiana.....	186,004
Michigan.....	4,818
New Jersey.....	22,664
New York.....	37,429
Ohio.....	26,141
Pennsylvania.....	184,682
West Virginia.....	12,201
Wisconsin.....	59,000

Table 4 presents comparative statistics of glass manufacture, by states, for the years 1880, 1890, and 1900.

TABLE 4.—COMPARATIVE STATISTICS, BY STATES: 1880 TO 1900.

STATES.	Year.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.							
				Number.	Salaries.	Total.		Men, 16 years and over.		Women, 16 years and over.		Children, under 16 years.	
						Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.
United States	1900	355	\$61,423,908	2,268	\$2,792,376	52,818	\$27,084,710	42,173	\$24,901,233	3,529	\$840,001	7,116	\$1,343,476
	1890	294	40,960,850	1,095	1,232,561	44,892	20,885,961	36,064	19,546,851	1,885	382,245	6,948	1,007,365
	1880	194	19,329,699	(^a)	(^a)	24,177	9,144,100	17,778	(^a)	741	(^a)	5,658	(^a)
Illinois.....	1900	6	2,181,801	75	110,100	3,304	1,621,286	2,607	1,495,891	148	28,456	549	95,939
	1890	13	1,721,878	31	44,710	2,762	1,188,051	2,215	1,121,526	20	3,860	527	62,665
	1880	6	425,000	(^a)	(^a)	732	342,027	632	(^a)	(^a)	(^a)	100	(^a)
Indiana.....	1900	110	12,775,389	509	649,227	13,015	7,226,047	10,910	6,808,042	634	129,808	1,471	288,197
	1890	21	3,556,563	79	75,682	3,010	1,469,149	2,633	1,422,104	197	27,811	180	19,234
	1880	4	1,442,000	(^a)	(^a)	862	284,207	695	(^a)	58	(^a)	114	(^a)
Kentucky.....	1900	5	795,000	(^a)	(^a)	522	150,322	384	(^a)	11	(^a)	147	(^a)
	1890	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)
	1880	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)	(^a)
Maryland.....	1900	7	581,086	31	88,976	742	339,518	562	313,920	54	8,678	126	16,925
	1890	11	871,111	16	12,176	1,397	696,560	1,045	650,921	24	6,864	328	38,775
	1880	7	406,000	(^a)	(^a)	612	234,254	524	(^a)	(^a)	(^a)	88	(^a)
Massachusetts.....	1900	5	253,949	39	28,060	387	188,674	343	179,236	19	4,392	25	5,046
	1890	6	365,051	18	17,774	496	201,653	455	195,221	19	3,732	22	2,700
	1880	10	723,000	(^a)	(^a)	946	383,842	828	(^a)	58	(^a)	60	(^a)
Missouri.....	1900	3	2,198,316	26	47,448	650	341,375	648	340,825	(^a)	(^a)	2	550
	1890	5	2,201,353	39	54,032	1,118	542,157	1,016	524,373	(^a)	(^a)	97	17,784
	1880	6	1,430,000	(^a)	(^a)	965	381,098	709	(^a)	36	(^a)	220	(^a)
New Jersey.....	1900	26	5,397,662	317	234,960	5,383	2,462,745	4,366	2,278,306	170	32,726	847	151,713
	1890	34	3,744,894	152	132,619	5,688	2,730,100	4,601	2,605,798	42	8,405	1,045	115,897
	1880	22	2,568,021	(^a)	(^a)	3,578	1,300,038	2,762	(^a)	46	(^a)	770	(^a)
New York.....	1900	27	2,242,334	117	139,698	2,556	1,305,264	2,201	1,239,971	73	17,881	282	47,462
	1890	30	2,297,699	56	61,413	3,229	1,422,626	2,587	1,319,607	92	17,025	550	85,994
	1880	29	1,375,600	(^a)	(^a)	3,078	1,046,312	2,116	(^a)	60	(^a)	912	(^a)
Ohio.....	1900	28	5,451,513	199	249,029	4,546	2,067,384	3,505	1,844,958	405	36,017	636	125,409
	1890	59	4,094,677	216	230,323	6,435	2,901,255	5,053	2,700,036	538	74,227	844	125,992
	1880	19	1,172,850	(^a)	(^a)	1,688	644,520	1,170	(^a)	81	(^a)	437	(^a)
Pennsylvania.....	1900	119	23,287,187	342	1,110,333	19,420	10,287,491	15,136	9,338,261	1,546	414,250	2,738	534,930
	1890	99	20,459,049	424	518,640	13,510	3,728,520	14,824	8,090,926	749	154,689	2,937	482,905
	1880	77	7,609,706	(^a)	(^a)	9,784	3,397,306	6,999	(^a)	294	(^a)	2,491	(^a)
West Virginia.....	1900	16	1,333,084	85	97,551	1,949	789,422	1,319	657,984	468	103,748	162	27,690
	1890	7	825,313	34	46,946	1,371	511,079	970	446,349	190	32,632	211	32,093
	1880	4	550,522	(^a)	(^a)	946	311,650	615	(^a)	100	(^a)	231	(^a)
All other states ⁶	1900	8	711,032	28	36,944	866	455,504	576	402,839	12	4,100	273	48,555
	1890	9	829,262	30	38,196	881	494,311	665	469,490	14	8,000	202	22,321
	1880	5	332,000	(^a)	(^a)	464	168,524	364	(^a)	12	(^a)	88	(^a)

¹ Includes proprietors and firm members, with their salaries; number only reported in 1900 but not included in this table. (See Table 12.)
² Includes 25 establishments idle or in process of construction, with a capital of \$525,100. Not separately reported by states in 1880.
³ Not reported separately.
⁴ No establishments reported.
⁵ Included in "all other states."
⁶ Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1. 1880—California, 1; Connecticut, 1; Iowa, 1; Michigan, 1; New Hampshire, 1.

TABLE 4.—COMPARATIVE STATISTICS, BY STATES: 1880 TO 1890—Continued.

STATES.	Year.	Miscellaneous expenses.	MATERIALS USED.							
			Total cost.	Mixing sand, tons.	Grinding sand, tons.	Soda ash (carbonate of soda), tons.	Salt cake (sulphate of soda), tons.	Nitrate of soda, tons.	Pearlash, pounds.	Litharge, pounds.
United States	1900	\$3,588,641	\$16,731,009	581,720	265,488	157,779	53,257	10,770	4,406,211	8,886,106
	1890	2,267,696	12,140,985	369,828	227,416	96,777	38,092	7,031	2,544,978	5,501,559
	1880	(1)	8,028,621	155,447	89,500	49,626	7,877	2,859	592,982	2,313,208
Illinois.....	1900	210,588	674,008	32,978		12,017		440		115,600
	1890	184,625	682,248	23,698		7,824	2,143	592		40,000
	1880	(1)	297,842	9,767		2,495	648			
Indiana.....	1900	690,165	4,582,141	179,367	71,152	48,629	14,371	2,329	453,481	1,482,887
	1890	360,384	865,374	81,821	50,000	7,608	4,694	263		
	1880	(1)	433,733	7,124	82,300	2,854				
Kentucky.....	1900									
	1890	(1)	184,104	3,548		840	337	49	20,000	7,000
	1880									
Maryland.....	1900	26,065	151,500	3,493		1,601		149	75,000	36,982
	1890	35,847	295,337	12,708		2,558		230	77,000	94,000
	1880	(1)	239,682	5,344		1,902	36	36		
Massachusetts.....	1900	14,248	137,185	1,622		194	125	24	207,967	364,448
	1890	35,760	127,180	1,920		386	157	16	74,300	140,750
	1880	(1)	329,864	2,205		392	255	75	130,111	298,260
Missouri.....	1900	98,119	281,515	10,366	4,743	3,048	226			
	1890	116,397	557,874	11,690	22,652	4,130	180	63		
	1880	(1)	351,871	8,042	7,200	3,071		81		
New Jersey.....	1900	241,655	1,488,700	81,260	433	20,630	697	1,314	60,270	72,049
	1890	116,000	1,310,953	49,278		16,644	1,542	263	34,035	39,373
	1880	(1)	1,088,346	26,282		8,274	1,320	120	100	20,000
New York.....	1900	145,505	899,590	22,820	50	7,508	1,453	548	469,185	822,130
	1890	167,900	825,498	21,050		6,444	2,116	232	500,334	1,213,264
	1880	(1)	944,691	16,122		5,865	26	194	142,456	559,257
Ohio.....	1900	155,512	1,253,164	37,707	6,397	11,072	1,751	1,259	850,171	2,063,000
	1890	294,744	1,602,599	54,406		12,894	6,607	1,628	335,216	785,991
	1880	(1)	459,333	10,003		3,244	233	332	28,000	210,000
Pennsylvania.....	1900	1,867,879	6,485,463	101,859	182,117	46,393	34,297	4,330	1,938,334	3,143,727
	1890	911,178	5,294,992	149,239	154,764	84,287	20,251	3,277	1,474,093	3,086,681
	1880	(1)	3,850,660	61,452		18,419	4,822	1,841	268,496	1,213,686
West Virginia.....	1900	112,791	593,251	10,025	46	2,847	337	307	351,802	285,283
	1890	40,805	277,033	5,350		2,209		416	50,000	100,000
	1880	(1)	208,064	3,133		1,315		179	3,769	
All other states ²	1900	26,119	284,492	10,223		3,835		70		
	1890	54,047	801,397	8,178		2,293		51		
	1880	(1)	180,481	2,375		955		2		

STATES.	Year.	MATERIALS USED—continued.							Cost of fuel. ¹	Aggregate value. ³
		Lime and quicklime, bushels.	Limestone, tons.	Arsenic, pounds.	Manganese, pounds.	Fire clay and pot clay, pounds.	Pots (not including those made at works), number.			
United States	1900	993,349	91,015	2,349,261	1,493,538	32,151,017	8,941	\$3,203,146	\$56,589,712	
	1890	929,706	45,482	1,823,007	610,915	37,066,652	8,006	2,840,912	41,051,004	
	1880	869,886	2,597	713,974	191,146	17,233,891	18,655	(1)	21,154,571	
Illinois.....	1900	56,734	4,815	45,607	59,838	642,000	309	155,400	2,384,398	
	1890	25,525	3,387	121,308	14,336	859,332	498	146,534	2,372,011	
	1880	49,607	300	26,100		833,000	627	(1)	901,343	
Indiana.....	1900	287,685	27,993	337,487	521,980	3,624,298	2,429	355,300	14,757,888	
	1890	61,313	6,877	214,100	87,052	3,153,600	701	89,866	2,995,409	
	1880	47,342		32,000		692,000	1,100	(1)	790,781	
Kentucky.....	1900		12	302	1,600	166,000	202	(1)	388,405	
	1890									
	1880	10,300								
Maryland.....	1900	18,910	185	4,621	11,167	245,900	164	47,980	557,895	
	1890	87,098		16,520	14,600	2,487,620	363	89,145	1,256,697	
	1880	62,365		2,710	1,500	692,000	587	(1)	587,000	
Massachusetts.....	1900	699	100	7,789	3,101	66,158	110	33,047	413,458	
	1890	20	890	4,275	8,150	330,733	45	44,691	431,437	
	1880	2,343	846	6,697	9,049	466,479	150	(1)	354,345	
Missouri.....	1900	782	4,112	24,233	33,000	426,520	58	75,689	765,564	
	1890	12,916	2,273	104,511	56,022	2,210,091	98	157,923	1,215,829	
	1880	47,275	300	24,000	3,960	951,350	601	(1)	919,827	

¹Not reported in 1880.²Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1. 1880—California, 1; Connecticut, 1; Iowa, 1; Michigan, 1; New Hampshire, 1.³While the aggregate value for the respective states is the aggregate value of products reported for all branches of glass manufacture, this total can not be obtained by adding the amounts given, as the reports of certain products have been suppressed, to avoid disclosing the operations of individual establishments.⁴No establishments reported.⁵Included in "all other states."

MANUFACTURES.

TABLE 4.—COMPARATIVE STATISTICS, BY STATES: 1880 TO 1900—Continued.

STATES.	Year.	MATERIALS USED—continued.							Aggregate value. ²
		Lime and quicklime, bushels.	Limestone, tons.	Arsenic, pounds.	Manganese, pounds.	Fire clay and pot clay, pounds.	Pots (not including those made at works), number.	Cost of fuel. ¹	
New Jersey	1900	248,854	8,577	102,490	148,465	2,108,845	366	445,828	5,093,822
	1890	198,086	8,897	75,256	17,065	8,841,290	518	884,951	5,218,152
	1880	174,680	455	88,453	12,000	2,880,998	2,118	(¹)	2,810,170
New York.....	1900	41,024	2,462	101,570	90,721	1,038,200	475	227,158	2,756,978
	1890	90,502	778	52,026	32,489	2,775,855	450	244,893	2,723,010
	1880	98,854	.....	6,600	27,505	1,837,650	1,661	(¹)	2,420,796
Ohio	1900	94,547	3,856	228,587	76,117	2,549,910	1,199	249,405	4,547,088
	1890	108,597	6,932	375,196	124,581	7,141,278	1,780	156,404	5,649,182
	1880	45,855	.....	28,916	16,480	848,025	885	(¹)	1,549,320
Pennsylvania.....	1900	184,969	38,309	896,074	457,581	15,926,246	3,461	1,421,710	22,011,130
	1890	258,674	20,248	746,393	216,910	18,086,298	3,223	858,281	17,179,137
	1880	309,122	1,124	547,266	110,178	6,495,169	5,170	(¹)	8,720,584
West Virginia.....	1900	19,660	450	80,508	58,944	154,940	350	88,905	1,871,705
	1890	14,107	.....	89,822	16,460	662,550	170	54,835	945,234
	1880	7,533	.....	8,518	8,518	935,720	392	(¹)	748,500
All other states ³	1900	39,705	656	20,800	32,624	378,000	20	102,724	924,705
	1890	61,763	1,195	28,500	23,260	518,500	160	113,034	1,065,397
	1880	18,825	.....	980	400	437,500	272	(¹)	463,500

STATES.	Year.	PRODUCTS—continued.							Pressed and blown glass and bottles and jars, value.
		Building glass.							
		Total value.	Window.		Plate.			Total cast, square feet.		Polished plate made, square feet.
50-foot boxes, number.	Value.		Total value.	Total cast, square feet.	Sold rough, square feet.				
United States.....	1900	\$17,096,234	4,841,282	\$10,879,855	\$6,194,279	634,758,994	628,684	16,888,578	\$89,443,478
	1890	18,928,296	3,768,884	9,058,802	4,869,494	619,319,509	3,106,881	9,100,111	27,122,708
	1880	5,915,618	1,864,784	5,047,313	868,305	61,700,227	377,227	1,042,000	15,238,953
Illinois	1900	.....	.....	.....	.....	.....	.....	.....	2,810,898
	1890	.....	.....	.....	.....	.....	.....	.....	1,945,790
	1880	373,348	115,271	373,348	.....	.....	.....	.....	528,000
Indiana	1900	5,711,948	1,701,729	4,176,587	1,520,361	68,558,888	81,917	5,177,160	9,045,935
	1890	1,831,745	860,114	885,745	946,000	2,888,793	100,000	1,768,248	1,163,654
	1880	725,797	91,759	229,397	496,400	970,000	180,000	642,000	64,984
Kentucky	1900	.....	.....	.....	.....	.....	.....	.....	.....
	1890	.....	.....	.....	.....	.....	.....	.....	.....
	1880	3,512	.....	.....	3,512	20,684	20,684	.....	894,893
Maryland.....	1900	.....	.....	.....	.....	.....	.....	.....	454,633
	1890	.....	.....	.....	.....	.....	.....	.....	674,800
	1880	382,000	141,000	332,000	.....	.....	.....	.....	255,000
Massachusetts.....	1900	.....	.....	.....	.....	.....	.....	.....	402,258
	1890	72,748	.....	.....	72,748	569,375	434,150	.....	.....
	1880	149,845	41,866	104,002	46,843	209,548	209,548	.....	704,600
Missouri	1900	.....	.....	.....	.....	.....	.....	.....	.....
	1890	.....	.....	.....	.....	.....	.....	.....	.....
	1880	390,550	24,000	68,000	322,550	500,000	17,000	400,000	529,277
New Jersey.....	1900	274,011	124,541	267,611	.....	.....	.....	.....	4,819,811
	1890	1,816,170	622,482	1,816,170	.....	.....	.....	.....	8,901,982
	1880	729,155	296,685	729,155	.....	.....	.....	.....	2,081,015
New York	1900	346,790	89,522	243,085	.....	.....	.....	.....	2,410,188
	1890	.....	.....	.....	.....	.....	.....	.....	2,000,842
	1880	540,903	216,748	540,903	.....	.....	.....	.....	1,879,803
Ohio	1900	671,422	200,854	519,187	.....	.....	.....	.....	3,375,661
	1890	.....	.....	.....	.....	.....	.....	.....	4,073,385
	1880	358,000	127,122	358,000	.....	.....	.....	.....	1,191,820
Pennsylvania.....	1900	9,213,545	2,068,840	5,801,131	3,912,414	19,546,674	579,905	10,877,250	12,797,585
	1890	6,406,924	1,430,455	3,648,577	2,768,347	9,024,273	515,177	5,849,519	10,772,213
	1880	2,222,513	780,283	2,222,513	.....	.....	.....	.....	6,493,071
West Virginia.....	1900	.....	.....	.....	.....	.....	.....	.....	1,770,553
	1890	.....	.....	.....	.....	.....	.....	.....	945,234
	1880	.....	.....	.....	.....	.....	.....	.....	748,500
All other states ³	1900	378,518	156,296	371,754	761,504	6,658,482	16,862	829,168	1,056,456
	1890	4,300,709	1,355,883	3,208,310	1,092,399	7,842,068	2,057,504	1,492,344	1,644,698
	1880	90,000	80,000	90,000	.....	.....	.....	.....	373,500

¹ Not reported in 1880.

² While the aggregate value for the respective states is the aggregate value of products reported for all branches of glass manufacture, this total can not be obtained by adding the amounts given, as the reports of certain products have been suppressed, to avoid disclosing the operations of individual establishments.

³ Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Michigan, 1; Wisconsin, 1. 1880—California, 1; Connecticut, 1; Iowa, 1; Michigan, 1; New Hampshire, 1.

⁴ Includes "all other products" for building glass as follows: Indiana, \$15,000; New Jersey, \$6,400; and Massachusetts, \$1,200; total, \$22,600.

⁵ Includes "cathedral," "skylight," "wire," and "all other products" for this class.

⁶ No establishments reported.

⁷ Included in "all other states."

TABLE 4.—COMPARATIVE STATISTICS, BY STATES: 1880 TO 1900—Continued.

STATES.	Year.	EQUIPMENT AND CHARACTERISTICS OF WORKS. ¹									
		Furnaces, number.	Pots, number.	Tanks. ²		Flatten- ing ovens, number.	Monkey ovens, number.	Casting tables, number.	Anneal- ing ovens, number.	Lehrs, number.	Clay grinding mills, number.
				Number.	Pot capacity.						
United States.....	1900	451	5,107	353	4,834	285	2	100	2,409	1,350	71
	1890	564	4,932			185	19	62	2,142	509	153
	1880	285	2,421			68	16	16	1,704		171
Illinois.....	1900	10	129	18	906	1	2	4	289	31	
	1890	27	225			8		6	269	11	4
	1880	8	74								
Indiana.....	1900	125	1,854	112	1,551	116		17	419	437	23
	1890	43	449			13	2	8	217	43	9
	1880	10	108								
Kentucky.....	³ 1900										
	⁴ 1890										
	1880	6	47								
Maryland.....	1900	12	107	1	6	2			21	20	2
	1890	19	161			4			34	23	6
	1880	9	68								
Massachusetts.....	1900	7	65	1	90	1			15	13	1
	1890	11	69			1		6	25	8	2
	1880	11	99								
Missouri.....	1900	7	110	6	78			14	180	2	1
	1890	13	143			1		23	117		7
	1880	7	51								
New Jersey.....	1900	33	255	51	769	6			266	100	4
	1890	80	469			22	1		352	50	22
	1880	44	289								
New York.....	1900	29	247	22	232	5		5	181	67	6
	1890	55	400			14	6	2	105	47	26
	1880	43	339								
Ohio.....	1900	42	539	18	237	12		3	144	119	5
	1890	85	806			25	1	1	123	142	21
	1880	20	187								
Pennsylvania.....	1900	163	2,117	98	1,803	133		57	880	435	27
	1890	197	1,932			45	9	16	733	241	43
	1880	112	1,029								
West Virginia.....	1900	15	156	20	90	2			18	65	1
	1890	17	144						18	33	3
	1880	8	82								
All other states ⁵	1900	3	28	12	127	2			96	11	1
	1890	12	79			2			94	1	6
	1880	7	48								

STATES.	Year.	EQUIPMENT AND CHARACTERISTICS OF WORKS—continued.									
		Grinding machines, number.	Polishing machines, number.	Shops, number.	Glory holes, number.	Presses or pressing ma- chines, number.	Finish- ing ma- chines, number.	Crimping ma- chines, number.	Grinding and en- graving ma- chines, number.	Horses and mules, number.	Wagons, carts, and drays, number.
United States.....	1900	227	294	3,978	1,419	964	140	494	187	409	407
	1890	186	214	2,804	880	801	91	233	733	530	484
	1880	70	70	1,353	437	522			716	749	679
Illinois.....	1900			427	143	13	2	1	3	23	24
	1890	4	50	115	48	2			1	25	13
	1880										
Indiana.....	1900	61	86	1,397	351	201	33	160	29	21	23
	1890	43		77	92	3			4	29	27
	1880										
Kentucky.....	⁴ 1900										
	⁵ 1890										
	1880										
Maryland.....	1900	1		67	24	7			4	13	17
	1890	3		148	23	4	50	15	17	21	21
	1880										
Massachusetts.....	1900			38	16	9		5		8	9
	1890			33	7	9			85	11	11
	1880										
Missouri.....	1900	21	24	26	6					9	7
	1890	26	50	23						30	24
	1880										

¹The equipment of glass manufacturing plants, other than furnaces and pots, not having been reported by state totals in 1880, the comparison can be made only for the United States for that year.

²Not reported in 1880 and 1890.

³No establishments reported.

⁴Included in "all other states."

⁵Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1. 1880—California, 1; Connecticut, 1; Iowa, 1; Michigan, 1; New Hampshire, 1.

TABLE 4.—COMPARATIVE STATISTICS, BY STATES: 1880 TO 1900—Continued.

STATES.	Year.	EQUIPMENT AND CHARACTERISTICS OF WORKS—continued.									
		Grinding machines, number.	Polishing machines, number.	Shops, number.	Gloryholes, number.	Presses or pressing machines, number.	Finishing machines, number.	Crimping machines, number.	Grinding and engraving machines, number.	Horses and mules, number.	Wagons, carts, and drays, number.
New Jersey.....	1900			718	301	55	1		22	98	111
	1890	12		323	199	17		47	122	107	
	1880										
New York.....	1900	3		312	66	49	2	32	9	49	47
	1890	7		236	41	30		23	67	65	
	1880										
Ohio.....	1900	12	10	613	93	125	59	35	5	13	13
	1890	13		441	130	243	21	57	258	31	33
	1880										
Pennsylvania.....	1900	129	174	144	351	444	42	252	54	134	126
	1890	73	114	1,316	370	403	20	151	303	213	147
	1880										
West Virginia.....	1900			153	23	60	1		10	6	6
	1890	2		104	24	35		10	60	12	12
	1880										
All other states ¹	1900			73	37	1			1	30	19
	1890	3		73	6					29	24
	1880										

Table 5 presents comparative statistics of glass manufacture, by classes of products, for the years 1880, 1890, and 1900, with the per cent of increase for each decade.

TABLE 5.—COMPARATIVE SUMMARY, BY CLASSES OF PRODUCTS, 1880 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	Year.	Total.	Building glass.	Pressed and blown glass and bottles and jars.	PER CENT OF INCREASE.		
					Total.	Building glass.	Pressed and blown glass and bottles and jars.
Number of establishments.....	1900	355	124	231	20.7	24.0	19.1
	1890	294	100	194	74.0	85.2	63.7
	1880	169	54	115			
Capital.....	1900	\$31,423,903	\$26,617,122	\$34,806,781	49.9	45.0	53.9
	1890	\$40,966,850	\$13,353,576	\$22,613,274	117.9	151.3	96.4
	1880	\$18,804,599	\$7,290,155	\$11,614,444			
Salaried officials, clerks, etc., number.....	1900	2,283	615	1,653	107.1	110.6	105.9
	1890	1,095	292	803			
	1880	(²)	(²)	(²)			
Salaries.....	1900	\$2,792,376	\$311,933	\$1,980,393	126.6	140.2	121.4
	1890	\$1,232,561	\$333,112	\$894,449			
	1880	(²)	(²)	(²)			
Wage-earners, average number.....	1900	52,313	11,902	40,316	17.7	30.7	24.3
	1890	44,332	11,932	32,310	85.7	147.3	70.2
	1880	24,177	4,846	19,331			
Total wages.....	1900	\$27,084,710	\$9,029,673	\$18,055,037	29.7	26.1	31.5
	1890	\$20,335,951	\$7,159,903	\$13,726,053	123.4	194.4	104.3
	1880	\$9,144,100	\$2,431,789	\$6,712,311			
Men, 16 years and over.....	1900	42,173	11,301	30,372	16.9	1.4	24.3
	1890	36,064	11,633	24,431	102.9	154.2	35.1
	1880	17,773	4,577	13,201			
Wages.....	1900	\$24,901,233	\$3,999,613	\$15,901,620	27.4	27.2	27.5
	1890	\$19,546,351	\$7,073,965	\$12,472,386			
	1880	(²)	(²)	(²)			
Women, 16 years and over.....	1900	3,529	20	3,509	37.2	370.1	93.0
	1890	1,335	67	1,268	154.4	27.2	130.1
	1880	741	92	649			
Wages.....	1900	\$340,001	\$4,901	\$335,100	152.8	376.2	163.0
	1890	\$32,245	\$20,593	\$11,652			
	1880	(²)	(²)	(²)			
Children, under 16 years.....	1900	7,116	31	7,035	2.5	371.3	5.6
	1890	6,943	232	6,661	22.7	59.3	21.5
	1880	5,653	177	5,431			
Wages.....	1900	\$1,343,476	\$25,159	\$1,313,317	33.4	361.5	39.9
	1890	\$1,007,365	\$65,345	\$942,020			
	1880	(²)	(²)	(²)			

¹ Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1. 1880—California, 1; Connecticut, 1; Iowa, 1; Michigan, 1; New Hampshire, 1.

² Not reported separately.

³ Decrease.

TABLE 5.—COMPARATIVE SUMMARY, BY CLASSES OF PRODUCTS, 1880 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE—Continued.

	Year.	Total.	Building glass.	Pressed and blown glass and bottles and jars.	PER CENT OF INCREASE.		
					Total.	Building glass.	Pressed and blown glass and bottles and jars.
Miscellaneous expenses.....	1900	\$3,588,641	\$1,365,865	\$2,222,776	58.3	27.7	85.5
	1890	\$2,267,696	\$1,069,545	\$1,198,151			
	1880	(¹)	(¹)	(¹)			
Cost of materials used.....	1900	\$16,731,009	\$4,679,084	\$12,051,925	37.8	1.2	60.3
	1890	\$12,140,985	\$4,621,535	\$7,519,450	51.2	102.0	31.0
	1880	\$8,028,621	\$2,287,987	\$5,740,634			
Value of products.....	1900	\$56,539,712	\$17,096,234	\$39,443,478	37.7	22.7	45.4
	1890	\$41,051,004	\$13,928,296	\$27,122,708	94.1	135.4	78.0
	1880	\$21,154,571	\$5,915,018	\$15,238,953			
Pot and tank furnaces, number.....	1900	804	241	563	42.6	23.6	52.6
	1890	564	195	369	97.9	137.8	81.8
	1880	285	82	203			
Pot capacity of furnaces, number.....	1900	9,941	3,726	6,215	101.6	84.1	113.7
	1890	4,932	2,024	2,908	103.7	178.1	73.1
	1880	2,421	741	1,680			

¹ Not reported.

Tables 4 and 5 show large increases in the number of salaried officials and their salaries, between 1890 and 1900, caused by the organization of large consolidations in the glass business within the last five years. The most interesting disclosure, however, is the widespread substitution of the tank for the pot furnace for melting glass. No statistics of tank furnaces appear in the report on glass manufacture at the census of 1890, although a number were in existence at that time. These tanks were then largely regarded as in the experimental stage, although it had been demonstrated in 1888 that their operation was a success, particularly in the manufacture of window glass. It was several years before glass manufacturers were convinced of the advantages of the tank over the pot furnace; but from 1890 on, the introduction of the tank has been steady and is the prominent feature of the progress of the American glass industry during the last decade. A larger production and a more uniform quality of glass are rendered possible by the use of the tank system of melting than by the pot-furnace system, especially in the manufacture of window glass and bottles and jars. Although the cost of the installation of the tank system is considerably greater than that of the pot system, the former is much more economical and regular in operation. In many departments of the glass industry it meets the demand for more glass for less money. The introduction of the continuous tank in the manufacture of bottles and jars has been fully as general as in the manufacture of window glass, and continuous and intermittent or day tanks are being more and more extensively used in the manufacture of common tumblers and jellies, opal ware, lantern globes, lamp founts, chimneys, shades, and globes, and novelties and specialties in pressed and blown ware.

The statistics of furnaces are of little value for comparative purposes, owing to the general introduction of the tank furnace during the last decade. The following comparisons have been made on the assumption that all furnaces reported in 1890 were pot furnaces; this is not strictly correct, as it is known that there were several tank furnaces in operation at that time, but they were not shown separately in the published statistics. The number of tank furnaces reported was small, however, and would not materially affect the comparisons.

Since 1890 there has been a decrease of 20 per cent in the total number of pot furnaces, 564 being reported in 1890 and 451 in 1900. In building glass, 195 pot furnaces were reported in 1890 and 193 in 1900, a decrease of only 2, while the decrease in the number of pot furnaces for pressed and blown glass and bottles and jars was 111, or 30.1 per cent, 369 being reported in 1890 and 258 in 1900. However, in 1900 there is a total increase for the United States of 353 tanks—206 continuous and 147 day—making a gain in the total number of melting furnaces in 1900 over 1890 of 240, or 42.6 per cent. In building glass, 34 continuous and 14 day tanks were reported in 1900, making an increase in the total number of furnaces for that class in 1900 of 23.6 per cent over the number reported in 1890. In the class of pressed and blown ware and bottles and jars, 172 continuous and 133 day tanks were reported in 1900, making a gain of 52.6 per cent in the total number of furnaces in that division in 1900 over the total for 1890.

By estimating the ring capacity of the continuous tank in building glass establishments as equal to 3 pots, and in pressed and blown glass and bottle and jar establishments as equal to 2 pots, and estimating the

ton capacity of the day tank in both classes as equal to a like pot capacity, the 353 tanks have a total capacity of 4,834 pots, 1,430 of which are in building glass factories and 3,404 in pressed and blown glass and bottle and jar factories. A comparison of the capacity of the pot furnaces reported in 1900 with the capacity reported in 1890, shows an increase in capacity of 3.5 per cent; an increase in building glass capacity of 13.4 per cent; and a decrease in pressed and blown ware and bottle and jar capacity of 3.3 per cent. However, the total capacity of both pot furnaces and tanks for the entire industry in 1900 increased 101.6 per cent over 1890; of building glass capacity, 84.1 per cent; and of pressed and blown ware and bottles and jars, 113.7 per cent. The increase of only 23.6 per cent in the number of furnaces in building glass factories, with an increase of 84.1 per cent in the pot capacity, indicates the much

larger capacity of the average window tank than that of the tank used in the production of pressed and blown ware and bottles and jars, where the number of furnaces increased 52.6 per cent and the pot capacity increased 113.7 per cent. The day tank in building glass factories is used in the manufacture of skylight, tile glass, etc.

The general introduction of the tank for glass melting has created, within the past decade, a separate industry of considerable magnitude—the preparation of the clay for the construction of tanks. At the same time the manufacture of the glass melting pot has been transferred largely from the glass factory to a few establishments that make a specialty of its manufacture.

Table 6 presents the rank of states in glass manufacture as a whole from 1880 to 1890, according to value of products, with the percentages of total value of products for the United States.

TABLE 6.—RANK OF STATES ACCORDING TO VALUE OF PRODUCTS: 1880 TO 1900, WITH PER CENT OF TOTAL VALUE.

STATES.	RANK.			VALUE OF PRODUCTS.			PER CENT OF TOTAL VALUE.		
	1900	1890	1880	1900	1890	1880	1900	1890	1880
United States.....				\$56,539,712	\$41,051,004	\$21,154,571	100.0	100.0	100.0
Pennsylvania.....	1	1	1	22,011,180	17,179,137	8,720,584	38.9	41.8	41.2
Indiana.....	2	4	8	14,757,888	2,995,409	790,781	26.1	7.3	3.7
New Jersey.....	3	3	2	5,093,822	5,213,152	2,810,170	9.0	12.7	13.3
Ohio.....	4	2	4	4,547,083	5,649,182	1,549,320	8.1	13.8	7.3
Illinois.....	5	6	6	2,384,398	2,372,011	901,843	5.0	5.8	4.3
New York.....	6	5	3	2,756,978	2,723,019	2,420,796	4.9	6.6	11.5
West Virginia.....	7	9	9	1,871,795	945,234	748,500	3.3	2.3	3.6
Missouri.....	8	8	5	765,564	1,215,329	919,827	1.4	3.0	4.4
Maryland.....	9	7	10	557,895	1,256,697	587,000	1.0	3.1	2.8
Massachusetts.....	10	10	7	418,458	481,437	854,345	0.7	1.0	4.0
Wisconsin.....	11	13		(1)	(1)	(2)			
California.....	12	14	13	(1)	(1)	140,000			0.7
Virginia.....	13			(1)	(2)	(2)			
Delaware.....	14	16		(1)	(3)	(3)			
Georgia.....	15	12		(1)	(1)	(2)			
Michigan.....	16	17	14	(1)	(1)	90,000			0.4
Colorado.....	17	15		(1)	(1)	(3)			
Kentucky.....		11	11	(2)	(1)	838,405			1.8
Connecticut.....			12	(2)	(2)	160,000			0.3
New Hampshire.....			15	(2)	(2)	70,000			0.3
Iowa.....			16	(2)	(2)	8,500			(3)
All other states ⁴				924,706	1,065,897		1.6	2.6	

¹ Included in "all other states."

² Not reported.

³ Less than one-tenth of 1 per cent.

⁴ Includes the following states: 1890—California, Colorado, Delaware, Georgia, Kentucky, Michigan, Wisconsin; 1900—California, Colorado, Delaware, Georgia, Michigan, Virginia, Wisconsin.

Glass manufacture was reported in 17 states in 1900; in 17, in 1890; and in 16, in 1880. Wisconsin, Virginia, Delaware, Georgia, and Colorado were not reported in 1880. Iowa, New Hampshire, and Connecticut dropped out of the producing column in 1890, but Wisconsin, Delaware, Georgia, and Colorado were added. In 1900, Virginia, the home of the first glass factory, was again reported. No reports of glass manufacture were made from Kentucky in 1900. Since 1900 glass factories have been projected in Washington, Kansas, Tennessee, and South Carolina.

Pennsylvania has occupied first place as a glass-producing state for the last three decades. The discovery of gas in Indiana attracted many factories early in the last decade, especially from Ohio, where the gas was practically exhausted for factory purposes after a few years' existence. As a result, in 1900 Indiana has changed places with Ohio as a glass-producing state, the value of its product in 1900 being nearly five times

that of 1890. New Jersey, the third state in 1900 and 1890, and the second in 1880, has held its prominent position by virtue of good sand deposits and advantageous geographical position, and largely from the fact that there are numerous native glass workers in the state not at all inclined to leave, even when better positions are offered elsewhere. There are indications, however, that this reserve on the part of the New Jersey workman is disappearing, and it is a question if the state will continue to hold its present position. West Virginia, which was ninth in glass manufacture in 1890, was seventh in the value of its glass products in 1900, increasing nearly 100 per cent during the decade. The excellent fuel resources of this state, in view of the rapid decline of the gas fields of Indiana, have recently greatly stimulated the growth of its glass manufacture, and will no doubt have the effect of placing it among the leading states in the industry.

The direction of the growth of the industry has

always closely followed the fuel supply. The evident failing of the gas supply in Indiana has fixed attention on the gas field of southeastern Kansas, and it is probable that in a short time the industry will be established in that section, although unfavorable freight rates and the refusal of the citizens to hold out tempting cash bonuses for the location of factories have so far kept the glass factory out of that field. Some establishments now in Indiana are likely to be soon moved to the gas fields of West Virginia or western Pennsylvania, and some have already been transferred into the coal fields of Indiana and Illinois and will operate with gas produced from the coal of these states. The largest factories in the Indiana gas field are likely to be soon equipped to operate with gas produced from coal, which will give the glass industry of the state a permanency

always lacking when cheap natural gas is the fuel used. During the present decade, owing to the absence of a great cheap fuel supply and the steady adoption of the producer gas-fuel system, many factories will be located at new points within convenient access to the great glass consuming sections, particularly in the West. The Pacific coast is attracting more and more attention as a field for glass manufacture, and the cheap fuel oil of southern California, coupled with the growing demand for a glass package from the fruit packers, will probably lead to a decided increase in the glass production of that state within a very short time.

BUILDING GLASS.

Table 7 presents comparative statistics, by states, for the building glass industry, for 1890 and 1900.

TABLE 7.—COMPARATIVE STATISTICS, BUILDING GLASS: 1890 AND 1900.

STATES.	Year.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.							
				Number.	Salaries.	Total.		Men, 16 years and over.		Women, 16 years and over.		Children, under 16 years.	
						Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.
United States	1900	124	\$20,617,122	615	\$811,983	11,902	\$9,029,673	11,801	\$8,999,613	20	\$4,901	81	\$25,159
	1890	100	18,353,576	1292	1,338,112	11,982	7,159,903	11,638	7,073,965	67	20,598	282	65,345
Indiana	1900	51	7,080,415	224	274,105	3,912	3,251,819	3,908	3,250,119			4	1,700
	1890	11	2,897,100	52	45,377	1,580	914,539	1,499	907,201	17	5,860	14	1,478
Massachusetts	1900	8	53,750	3	1,250	84	26,602	84	26,602				
New Jersey	1900	4	218,990	8	6,824	230	163,245	230	163,245				
	1890	12	967,923	22	16,288	1,082	720,184	1,048	717,104			34	3,080
New York	1900	7	384,085	11	15,160	228	164,291	226	163,979			2	312
	1890												
Ohio	1900	7	2,089,184	25	22,570	477	376,006	477	376,006				
	1890												
Pennsylvania	1900	46	14,661,120	307	435,015	6,459	4,706,720	6,368	4,679,801	20	4,901	71	22,018
	1890	28	9,715,850	104	145,152	5,399	3,258,692	5,172	3,192,078	50	14,733	177	51,881
All other states ³	1900	9	2,283,428	40	53,807	596	367,592	592	366,463			4	1,129
	1890	46	4,713,953	111	130,045	3,887	2,239,836	3,830	2,230,980			57	8,906

STATES.	Year.	Miscellaneous expenses.	Aggregate cost.	MATERIALS USED.									
				Glass sand.		Soda ash (carbonate of soda).		Salt cake (sulphate of soda).		Nitrate of soda.		Limestone.	
				Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.
United States	1900	\$1,365,865	\$4,679,084	177,966	\$298,879	25,500	\$388,534	52,789	\$512,835	614	\$9,262	60,274	\$106,540
	1890	1,069,545	4,621,595	167,792	352,904	22,715	718,098	85,624	561,398	76	3,605	38,912	117,690
Indiana	1900	348,665	1,319,675	59,746	102,019	3,037	106,833	14,158	180,018	50	1,875	18,911	31,937
	1890	297,127	510,845	18,785	47,481	2,567	79,137	4,409	55,970			6,467	15,577
Massachusetts	1900	2,112	32,921	958	2,626	210	6,560	157	4,710			195	450
New Jersey	1900	12,141	86,720	2,768	2,833	615	11,396	500	5,700			350	850
	1890	40,253	366,203	14,594	16,991	4,183	129,806	42	876			3,337	13,528
New York	1900	14,569	120,748	2,977	3,773	59	1,433	1,453	13,605	23	1,056	917	1,621
	1890												
Ohio	1900	19,505	158,526	5,851	7,836	666	9,669	1,751	18,428			1,982	3,102
	1890												
Pennsylvania	1900	867,163	2,697,041	95,176	172,003	13,206	168,022	34,239	286,548	541	6,331	34,910	62,330
	1890	391,847	2,236,396	71,085	190,178	7,017	240,799	20,036	342,947			18,193	60,734
All other states ³	1900	103,817	296,374	11,453	10,415	2,917	41,131	688	8,536			3,204	6,600
	1890	338,201	1,476,170	52,370	95,678	8,738	261,736	10,980	156,895	76	3,605	10,720	27,401

¹ Includes proprietors and firm members, with their salaries; number only reported in 1900 but not included in this table. (See Table 13.)

² Included in "all other states."

³ Includes establishments distributed as follows: 1900—Illinois, 1; Maryland, 2; Massachusetts, 1; Missouri, 2; West Virginia, 2; and Delaware, 1. 1890—Plate glass: Illinois, 2; Missouri, 2; New York, 1; and Ohio, 1. 1890—Window glass: Delaware, 1; Illinois, 3; Maryland, 4; Massachusetts, 1; Michigan, 1; Missouri, 1; New York, 8; and Ohio, 21.

MANUFACTURES.

TABLE 7.—COMPARATIVE STATISTICS, BUILDING GLASS: 1890 AND 1900—Continued.

STATES.	Year.	MATERIALS USED—continued.											
		Lime and quick-lime.		Arsenic.		Manganese.		Grinding sand.		Rouge.		Fire clay and pot clay.	
		Cwt.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Tons.	Cost.	Pounds.	Cost.	Pounds.	Cost.
United States.....	1900	125,080	\$12,315	1,321,130	\$63,067	63,600	\$2,316	263,933	\$160,305	835,749	\$24,448	23,510,700	\$170,522
	1890	92,026	17,590	1,092,622	38,191	126,822	5,335	227,416	151,995	1,116,669	64,390	26,050,242	240,137
Indiana.....	1900	12,060	1,745	517,839	25,867	13,000	735	70,853	36,811	267,345	9,061	7,282,228	57,819
	1890	1,772	435	113,500	4,479	42,000	1,700	50,000	20,000	150,000	7,350	2,918,000	25,985
Massachusetts.....	1900	16	6	2,000	60	5,000	250					105,212	727
	1890												
New Jersey.....	1900	72,922	2,878	5,085	280							196,840	2,148
	1890	14,050	5,613	11,724	403							1,057,500	14,653
New York.....	1900			40,552	2,066	1,200	63					288,750	2,438
	1890												
Ohio.....	1900	3,150	482	105,243	4,875			6,800	2,040	14,900	723	1,603,910	4,740
	1890												
Pennsylvania.....	1900	20,185	3,919	610,807	27,923	20,400	643	181,537	119,557	582,524	13,971	13,365,852	97,832
	1890	13,117	3,697	582,279	19,663	4,500	190	154,764	120,669	640,669	52,154	9,587,565	112,544
All other states ²	1900	16,713	3,796	41,604	2,056	34,000	875	4,743	1,897	20,980	693	773,120	6,045
	1890	68,071	7,839	383,119	13,586	74,822	3,135	22,652	11,826	326,000	4,886	12,381,965	86,228

STATES.	Year.	MATERIALS USED—continued.										
		Pots (not including those made at works).		Fuel.								All other materials, cost.
				Total cost.	Natural gas, cost.	Oil.		Coal.		All other fuel, cost.		
						Gallons.	Cost.	Tons.	Cost.			
Number.	Cost.											
United States.....	1900	3,830	\$101,061	\$1,119,022	\$751,354	723,654	\$23,161	269,611	\$395,856	\$8,651	\$1,759,978	
	1890	2,587	87,434	990,993	328,274	47,250	2,250	414,576	611,743	48,726	1,271,775	
Indiana.....	1900	1,482	45,035	195,376	193,590	489	78	432	1,138	570	525,003	
	1890	447	15,885	81,958	200			64,525	80,758	1,000	154,878	
Massachusetts.....	1900	26	340	13,488				4,083	10,500	2,933	3,709	
	1890											
New Jersey.....	1900	65	1,800	80,343		133,414	4,070	12,406	24,905	1,868	28,497	
	1890	159	4,445	119,741		47,250	2,250	33,581	101,193	16,293	60,087	
New York.....	1900	332	10,395	42,741		54,171	2,742	20,769	37,450	2,549	41,557	
	1890											
Ohio.....	1900	336	9,110	35,772	11,212	113	25	28,598	24,323	212	61,740	
	1890											
Pennsylvania.....	1900	1,366	25,641	710,415	535,070	177,256	5,679	161,368	166,866	2,800	1,001,856	
	1890	912	43,042	375,254	298,590			67,643	74,125	2,539	674,525	
All other states ²	1900	249	9,580	104,375	11,482	353,211	10,567	46,043	81,174	1,152	100,325	
	1890	1,043	23,722	400,557	29,484			244,744	345,162	25,911	378,576	

¹Included in "all other states."

²Includes establishments distributed as follows: 1900—Illinois, 1; Maryland, 2; Massachusetts, 1; Missouri, 2; West Virginia, 2; and Delaware, 1. 1890—Plate glass: Illinois, 2; Missouri, 2; New York, 1; and Ohio, 1. 1890—Window glass: Delaware, 1; Illinois, 3; Maryland, 4; Massachusetts, 1; Michigan, 1; Missouri, 1; New York 8; and Ohio 21.

TABLE 7.—COMPARATIVE STATISTICS, BUILDING GLASS: 1890 AND 1900—Continued.

STATES.	Year.	PRODUCTS.											All other products, value.
		Building glass.											
		Total value. ¹	Window.		Plate.								
			Boxes.	Value.	Total cast.	Rough, sold.		Polished plate made.		Cathedral.			
			Square feet.	Square feet.	Value.	Square feet.	Value.	Square feet.	Value.				
United States.....	1900	\$17,096,234	4,341,282	\$10,879,855	34,758,994	628,684	\$75,887	16,883,578	\$5,158,598	8,846,361	\$567,252	\$415,142	
	1890	13,923,296	3,768,884	9,037,137	219,319,509	3,106,831	337,037	9,100,111	4,172,484	2,773,824	279,407	102,161	
Indiana	1900	5,711,948	1,701,729	4,176,587	8,553,838	31,917	4,780	5,177,160	1,415,224			15,000	
	1890	1,831,745	360,114	885,745	2,383,793	100,000	20,000	1,753,248	886,000			40,000	
Massachusetts	1900												
	1890	72,748			569,376	484,150	59,025					13,723	
New Jersey	1900	274,011	124,541	267,611								6,400	
	1890	1,316,170	622,432	1,295,100								21,070	
New York	1900	346,790	89,522	243,085								57,011	
	1890												
Ohio.....	1900	671,422	200,854	519,187									
	1890												
Pennsylvania	1900	9,213,545	2,068,340	5,301,131	19,546,674	579,905	68,032	10,877,250	3,441,734			331,643	
	1890	6,406,924	1,430,455	3,648,577	9,024,273	515,177	82,232	5,849,519	2,676,115				
All other states ⁴	1900	878,518	156,290	371,754	6,658,482	16,862	3,075	329,168	301,640	8,846,361	567,252	5,083	
	1890	4,300,709	1,355,883	3,207,765	7,342,068	2,057,504	175,800	1,492,344	610,369	2,773,824	279,407	27,363	

STATES.	Year.	EQUIPMENT AND CHARACTERISTICS OF WORKS.												
		Furnaces, number.	Pots, number.	Tanks. ⁶		Flatten- ing ovens, number.	Mon- key ovens, num- ber.	Casting tables, number.	Anneal- ing ovens, number.	Clay- grinding mills, number.	Grind- ing ma- chines, number.	Polish- ing ma- chines, number.	Horses and mules, num- ber.	Wagons, carts, and drays, number.
				Number.	Pot capacity.									
United States.....	1900	193	2,296	48	1,430	285	2	100	869	63	227	294	92	93
	1890	195	2,024			135	19	62	542	75	123	214	220	137
Indiana	1900	82	825	13	552	116		17	258	22	61	86	14	13
	1890	27	393			13	2	8	172	9	89	50	22	21
Massachusetts	1900													
	1890	6	22					6	21				8	3
New Jersey	1900	3	24	3	72	6				3			6	7
	1890	24	188			22	1			9			27	23
New York	1900	9	65			5		5	5	6	3		5	3
	1890													
Ohio.....	1900	13	162	2	66	12		3	23	3	12	10	3	2
	1890													
Pennsylvania	1900	66	1,014	29	731	133		57	485	23	129	174	47	52
	1890	61	750			45	9	16	245	22	59	114	93	60
All other states ⁴	1900	20	206	1	9	8	2	18	98	6	22	24	17	16
	1890	77	731			55	7	32	104	35	25	50	75	75

¹ While the total value for the respective states is the total value of products reported for all classes of the building glass manufacture, this total can not be obtained by adding the amounts given, as the reports of certain products have been suppressed to avoid disclosing the operations of individual establishments.

² Includes 4,338,743 square feet of skylight, ribbed glass, opalescent glass, etc.

³ Included in "all other states."

⁴ Includes establishments distributed as follows: 1900—Illinois, 1; Maryland, 2; Massachusetts, 1; Missouri, 2; West Virginia, 2; and Delaware, 1. 1890—Plate glass: Illinois, 2; Missouri, 2; New York, 1; and Ohio, 1. 1890—Window glass: Delaware, 1; Illinois, 3; Maryland, 4; Massachusetts, 1; Michigan, 1; Missouri, 1; New York, 8; and Ohio, 21.

⁵ Not reported in 1890.

Of the 124 establishments reporting for 1900, 13 manufacture polished plate glass, 9 of which also make skylight; 11, rough, rolled, or ribbed glass, cathedral, wire, or skylight glass, or glass tiling and no plate glass; and 100, window glass.

Plate Glass.—The plate-glass establishments are located as follows, by states: 8 in Pennsylvania; 3 in Indiana; and 1 each in Missouri and Ohio. The total capacity of these plants is 53 furnaces with 1,100 pots, having an estimated capacity of 31,866,000 square feet a year. However, only 696 pots were active during the census year, casting 21,172,129 square feet of glass, 16,883,578 square feet of which were polished, and 628,684 square feet sold as rough glass. In 1900, 85.5 per cent more polished plate glass was made than in 1890, while the prices at which it sold were 33.3 per cent under those of 1890. In 1876, three years after the first substantial success in the manufacture of polished plate glass in the United States, the domestic production was about 600,000 square feet, and importations for consumption were 4,628,439 square feet, indicating a total plate-glass consumption in the United States of 5,228,439 square feet, against sales of foreign and domestic glass in 1900 of about 18,000,000 square feet, the imports of plate glass for consumption for the year amounting to 1,064,079 square feet.

After abortive attempts to successfully manufacture polished plate glass in this country, at Cheshire, Mass., in 1852-53, and at Lenox Furnace, Mass., in 1855-1871,¹ the first successful production of polished plate glass occurred at the plant at New Albany, Ind., built in 1869 by Capt. J. B. Ford, and operated after 1872 by W. C. DePauw. Not until 1873 did the plant succeed in producing polished plate glass, and Mr. De Pauw stated² that not until 1879 was it possible to produce the glass at a profit. This plant was dismantled at some time during the last decade because of unfavorable location and obsolete equipment. The manufacture of polished plate glass was commenced at Crystal City, Mo., in 1875, by the American Plate Glass Company, which company was reorganized the following year by the Hon. E. A. Hitchcock as the Crystal City Plate Glass Company, and has continued in successful operation since, the plant now being owned by the Pittsburg Plate Glass Company, which owned 10 of the 13 establishments reported in 1900. When Captain Ford left New Albany in 1872,³ he at once located a plant at Louisville, Ky., leaving there in 1875, and starting a plant at Jeffersonville, Ind. These 4 establishments were the ones reported at the census of 1880.

The large profits made by these establishments caused a boom in plate glass factory erection, which was further stimulated by the discovery of gas in Indiana about 1890,

the success of natural gas in the manufacture of plate glass having been demonstrated in the factory built by Captain Ford at Creighton, Pa., in 1883. In 1893 Hon. E. A. Hitchcock stated before the Ways and Means Committee of the House of Representatives that there were 12 establishments manufacturing polished plate glass, located at Creighton, Tarentum, Charleroi, Ford City, Butler, Duquesne, and Irwin, in Pennsylvania; New Albany, Elwood, Kokomo, and Alexandria, in Indiana; and Crystal City, Mo. These establishments manufactured plate glass largely in excess of the consumption, and a period of low prices followed, that led, in 1895, to the consolidation of eight establishments under the head of the Pittsburg Plate Glass Company. The outside establishments were the DePauw, at New Albany, Ind.; the American, at Alexandria, Ind.; the Standard Plate Glass Company, at Butler, Pa.; and the Penn Plate Glass Company, at Irwin, Pa. The plant at New Albany was soon abandoned and that at Alexandria was closed, but on the burning of the factory at Irwin about two years ago, the Penn Plate Glass Company secured the factory at Alexandria, Ind., and now operates it as the American Plate Glass Company.

In 1897 the Marsh Plate Glass Company erected a plant at Walton (now Floreffe), Pa., to manufacture thin plate glass under the patents of George Marsh, which substituted a table for holding the plate by a vacuum process in place of plaster of paris, during the grinding and polishing. The Marsh Company claimed to be able to successfully manufacture polished plate glass in all popular glazing sizes as thin as one-sixteenth of an inch, and by their improved table and system of holding the glass, to practically eliminate all breakage. Before this claim was fully demonstrated, the plant was bought by the Pittsburg Plate Glass Company, and has since been used largely as an experimental factory. Experiments in the manufacture of thin plate glass are also being tried at the plant of the Pittsburg Company at Ford City, Pa. The Marsh Company was the first to successfully introduce the continuous Lehr for annealing plate glass, a process that promises to soon displace the slower and more expensive annealing kiln system. A factory was erected near Toledo, Ohio, by the Edward Ford Plate Glass Company in 1900, which was in operation only six months during the census year. This factory is equipped with a continuous Lehr, and in the extensive use of electricity as motive power is an innovation.

The principal improvement in plate glass manufacture during the last decade was undoubtedly the successful introduction of the annealing Lehr, as noted above, at the plant of the Marsh Plate Glass Company, at Walton, Pa. Although its introduction into the older plants has so far been slow, owing to the expense attending the abandonment of the costly kiln system in use at those plants, yet competition will soon have the effect of bringing the Lehr into general use. Previous to the introduction of the Lehr, the annealing

¹ Tenth Census of the United States, Report on Glass Manufacture; by Joseph D. Weeks, Special Agent, page 98.

² *Ibid.*, page 99.

³ *Ibid.*, page 99.

of plate glass was done in practically the same manner as at the commencement of the industry in this country. As soon as the cast is made the plate is introduced into the annealing oven or kiln, a large, shallow, reverberatory furnace of brick, on the smooth floor of which the plate is laid. The kiln being heated to near the melting point and all openings tightly closed, it is allowed to cool gradually to a point where it is opened and the plate removed, the process requiring fully three days.

The plate glass annealing lehr averages about 200 feet in length, and starts from the casting table as a continuous, connected series of five kilns, after which it is the usual rod lehr common in window glass manufacture. The five stations at the start are on a solid hearth of especially prepared clay, giving an absolutely smooth, level bed. The whole interior of the lehr is brilliantly lighted by electricity, and the heat at any point can be controlled with the utmost nicety by the use of pyrometers. After the cast is made the plate is introduced into the first station of the lehr, where the temperature is near the melting point. In due time the plate passes into the second station, where the temperature is lower. So the plate passes through the five stations with a diminishing temperature. When the plate leaves the fifth station, it has become thoroughly "set," and passes to the rod lehr, which carries it along through decreasing temperatures until, three hours after the cast was made, the annealing process is complete, and the plate is taken out of the lehr ready for the grinding process. The time required to anneal a plate under the lehr system, compared with that under the kiln system—three hours' as against three days—indicates the revolutionizing possibilities of the lehr, when cost of construction is also taken into consideration. A lehr that will anneal the product of 96 pots, or 96 plates of glass a day, costs about \$20,000 to build, and displaces 96 old-style three-plate kilns, which cost about \$1,000 each to build. The lehr takes up far less space than does the kiln system, and the building required for the lehr costs about \$6,000, as against \$30,000 for the construction of the proper building for the 96 kilns it would displace.

With the lehr, smaller pots are used and thinner and smaller plates cast, resulting in a great increase in the average size of the finished plate, as the smaller the original cast, the better are the chances for the plate going through the annealing, grinding, and polishing processes successfully without diminution of size. The lehr-annealed plate, is much straighter than that annealed in the kiln, owing to the solid hearth of the first five stations of the lehr; the floor of the kiln is much more liable to develop inequalities which misshape the plate. The thinness of the lehr-annealed plate means less time spent in grinding, and the smaller size of the rough plate, makes it possible to lay and relay the lehr-annealed plate on the grinding and polishing tables, much quicker, and with less labor, than the kiln-annealed plate.

H. L. Dixon, the well-known glass furnace engineer, asserts that 90 per cent of the polished plate glass manufactured can be annealed in the lehr, the remaining 10 per cent being glass in extremely large sizes, requiring the old style kiln. He is convinced that it is only a question of time until the very largest sizes can be annealed in the lehr. It is claimed that actual practice has shown that the average size of the lehr-annealed glass, cast from small pots, is 90 square feet per plate when squared, while under the kiln system, with large pots and the attempt to continually cast extreme sizes, the average size of the plate taken from the kiln and squared is about 60 square feet, and when finished, about 18 square feet. In addition to the lehr at Floreffe, Pa., the Pittsburg Plate Glass Company reported 3 lehres at Ford City, Pa., 2 of the 3 being for large sizes and the third for small sizes of about 50 to 60 square feet. The Ford Plate Glass Company, near Toledo, Ohio, report 1 lehr that is said to operate successfully on sizes of 50 to 60 square feet. At Alexandria, Ind., the American Plate Glass Company have a lehr which is said to be working satisfactorily with plates from 75 to 80 square feet.

As is often the case with important inventions, the successful introduction of the lehr in plate glass manufacture came, not from experts, but from novices in the plate glass business, who carried it to success, while the plate glass manufacturers greeted it with derision and declared it impossible. Henry Fleckner, a veteran window glass factory manager of Pittsburg, was the man who first operated the lehr with success at Walton, and the successful operation of the lehres at Ford City and Toledo, is said to be largely due to Eugene Morenus, a window glass factory manager, and Ralph Gray, a manufacturer of skylight glass.

In addition to the lehr, the Marsh Plate Glass Company at Walton introduced, in the Marsh patent table, the idea of reducing the temperature of the glass while being ground and polished, by the circulation of a constant flow of water under the table. This cooling device, which permits the operation of the grinders and polishers at a much higher speed, has been installed in several foreign factories by Mr. Marsh, and will no doubt soon be put into use in this country. The transfer tables introduced at Ford City, Pa., in the last decade, have added considerably to the rapidity and ease of production, as has also the extended use of electricity as a lifting and motive power. Prior to the adoption of the transfer table, the grinding and polishing tables were stationary, and after one side of the plate had been ground and polished, it was necessary to remove it from its bed of plaster to continue the process. The transfer table is movable from grinder to polisher, thus making it possible to grind and polish one side of a plate without turning it, effecting a great saving in time and decreasing the loss by breakage attending the operation of moving the plate from its bed of plaster of paris.

President John Pitcairn, of the Pittsburg Plate Glass Company, testified¹ before the subcommission of the United States Industrial Commission, at Philadelphia, Pa., December 22, 1900, that since the inception of the plate glass industry in this country, the tendency of prices has been downward, except during 1900, when prices were increased, as a result of an average increase in the cost of raw materials of about 85 per cent, increased cost of manufacture, owing to the diminution of the gas supply, and the substitution of coal, and a better understanding among the manufacturers. He submitted the following table of prices, at periods of five years from 1875 to 1900:

SQUARE FEET.	1875	1880	1885	1890	1895	1900
1 to 3.....	\$0.71	\$0.51	\$0.46	\$0.40	\$0.30	\$0.31
3 to 5.....	0.84	0.61	0.55	0.48	0.36	0.38
5 to 10.....	1.12	0.80	0.72	0.64	0.48	0.60
10 to 25.....	1.49	1.06	0.96	0.85	0.63	0.81
25 to 50.....	1.66	1.11	1.01	0.89	0.66	0.85
50 to 100.....	1.69	1.21	1.09	0.97	0.72	0.90

During 1897, overproduction resulted in a demoralized condition of the industry, and prices were very low. The advance in prices from that time to 1900 was estimated by Mr. Pitcairn to amount to from 50 to 60 per cent. According to the same authority, about two-thirds of the American plate-glass production is sold in sizes under 10 square feet and without profit, a very large part of this two-thirds being sold at a loss. This glass comes into competition with the imported German looking-glass plate, which is blown, ground, and polished, and imported largely into this country to be silvered and used in cheap mirrors. For several years the American plate-glass manufacturers have been meeting this glass, and by a special arrangement with the manufacturers of furniture and mirrors, have succeeded in displacing it with domestic plate glass of a better quality, at prices less than the cost of production. Since 1895 the bulk of the American polished plate glass has been sold direct to the consumer, the Pittsburg Plate Glass Company having established jobbing houses in nearly a score of the large cities, in which branch of the business \$4,044,000 was invested in 1900.

For years and with but slight interruptions, the plate-glass manufacturing interests of Europe have been closely allied as to regulation of prices and adjustment of production. As the business of the plate-glass industry in the United States has never been extended beyond the home market, cooperation on that account has not been considered valuable by the European interests; hence, this market has been a "dumping ground" for the surplus European production, and exceptionally low prices have been made on foreign glass for the United States. During the census year prices on stock sizes of European polished plate glass were 36 per cent lower for the United States than for England, while

¹Report of the Industrial Commission, Vol. XIII, Trusts and Industrial Combinations, pages 225 to 242.

polished plate glass imported into the United States from France, averaged only about 50 per cent of the prices quoted in that country. The fact that the European surplus is placed in this market at a price below average cost, accounts for the heavy importations of polished plate glass. In face of this the domestic production in 1900 increased 85.5 per cent over that of 1890, evincing the steady acquisition of the home market for the domestic product. The production of polished plate glass in Europe in 1900 was given by Mr. Pitcairn in his testimony, in the following table, which shows the regulation of production by giving the productive capacity, and the actual output of the several factories:

NAMES OF COMPANIES.	Producing capacity, square feet.	Actual output, square feet.
Belgium:		
Auvelais.....	5,000,000	2,500,000
St. Roch.....	5,000,000	2,500,000
Moustier.....	3,800,000	1,600,000
Charleroi.....	2,900,000	1,400,000
Oignies.....	2,200,000	1,100,000
Courcelles.....	2,100,000	1,100,000
Roux.....	1,900,000	1,100,000
Floreffe.....	1,500,000	700,000
St. Gobain.....	800,000	400,000
Total, 9 factories.....	24,700,000	12,400,000
France:		
St. Gobain (4 factories).....	7,500,000	3,800,000
Nord.....	3,700,000	1,800,000
Aniche.....	1,700,000	1,400,000
Boussois.....	1,600,000	800,000
Assevent.....	800,000	800,000
Total, 8 factories.....	15,300,000	7,800,000
Germany:		
Stolberg and Mannheim.....	4,700,000	2,400,000
Eckamp.....	2,600,000	1,300,000
Schalke.....	2,000,000	1,000,000
Herzogenrath.....	1,900,000	1,000,000
Perz-Urbach.....	1,600,000	800,000
Frieden.....	1,200,000	600,000
Altwasser.....	700,000	300,000
Total, 8 factories.....	14,700,000	6,600,000
England:		
Pilkington Brothers.....		4,200,000
London and Manchester.....		2,300,000
British.....		900,000
Union.....		500,000
Total, 4 factories.....	17,900,000	7,900,000
Austria:		
Stankau.....		
St. Gobain (Bilen).....		
Total, 2 factories.....	12,300,000	1,100,000
Russia:		
Nord.....		1,100,000
LaKash.....		700,000
Moscow.....		700,000
Midi.....		700,000
Total, 4 factories.....	13,200,000	3,200,000
Italy:		
Pisa (St. Gobain Company).....	800,000	800,000
Grand total.....	68,900,000	39,800,000

¹Producing capacity of each factory not reported separately.

The average wages paid in plate glass manufacture in the United States, during the year 1900, was estimated by Mr. Pitcairn to be about 200 per cent higher than in England, and about 300 per cent higher than in Belgium. In support of the latter claim he presented the following table, giving a comparison of American and

Belgian wages in the plate glass industry in 1900, the Belgian figures being compiled by the European representative of the Pittsburg Plate Glass Company:

	American rate per month, 30 days.	Belgian rate per month, 30 days.	Per cent American higher than Belgian.
Casting department:			
Foremen	\$150.00	\$96.50	56.0
Finishers	92.10	28.95	218.0
Melters	82.50	28.95	185.0
Skimmers	70.50	28.95	144.0
Stowers	70.50	28.95	144.0
Furnace cleaners	60.00	20.26	196.0
Kiln dressers	68.00	20.26	241.0
Casting and drawing	57.00	20.26	181.0
Cutters	86.40	20.26	326.0
Fillers	57.00	20.26	181.0
Bookers	57.00	20.26	181.0
Teamers	90.00	28.95	211.0
Kiln heaters	54.00	17.37	211.0
Grinding department:			
Foremen, day	121.20	28.95	318.0
Foremen, night	121.20	28.95	318.0
First grinders	82.80	23.16	257.0
Second grinders	68.40	23.16	195.0
First layers	99.00	35.16	327.0
Second layers	68.40	9.65	609.0
Canal men	52.20	20.26	158.0
Sandpit men	52.20	20.26	158.0
Matchers	71.00	20.26	250.0
Sand wheelers	52.20	20.26	158.0
Polishing department:			
Foremen, day	121.20	34.74	250.0
Foremen, night	121.20	34.74	250.0
First layers	111.60	23.16	382.0
Second layers	95.76	23.16	313.0
Third layers	90.00	23.16	289.0
Fourth layers	79.36	23.16	243.0
Mixers	78.12	17.37	350.0
Plaster wheelers	45.00	20.26	122.0
Matchers	72.00	20.26	255.0
Finishers	54.72	20.26	255.0
Bench boys	39.60	8.40	371.0
Warehouse:			
Foremen	150.00	40.00	275.0
Examiners	75.00	20.26	270.0
Cutters	67.50	20.26	233.0
Gang men	42.00	17.37	141.0
Blockers	45.00	17.37	159.0
Glass washers	37.50	17.37	116.0
Frames:			
Foremen	80.00	30.00	166.0
Examiners	60.00	28.95	108.0
Cutters	63.00	28.95	180.0
Gang men	60.00	20.24	196.0
Emery department:			
Washer	60.00	34.74	73.0
Washer, helper	50.00	17.37	187.0
Machinery department:			
Foremen	150.00	48.42	245.0
Engineers	63.00	25.50	147.0
Machinists	97.50	26.05	274.0
Carpenters	80.00	23.16	245.0
Bricklayers	90.00	23.16	289.0
Laborers	37.50	17.37	116.0
Pipe fitters	67.50	24.00	181.0
Blacksmith	79.50	24.12	230.0
Blacksmith, helper	45.00	17.37	159.0
Boiler men	60.00	25.50	135.0
Pot department:			
Foremen	90.00	28.95	211.0
Pot makers	70.50	28.95	144.0
Tampers	51.10	18.33	179.0
Gas producers:			
Foremen	85.00	28.95	194.0

About 66 per cent of the wage-earners in the plate-glass industry are native Americans. At the commencement of the industry in the United States it was necessary to get foreign workmen of experience, but the American is so much quicker to learn and is so much more steady, that he is preferred at present.

All of the improvement made in the manufacture of plate glass in this country during the last twenty-five years, aside from some details in the construction of machinery, has been for the purpose of increasing the size of the plates cast and improving the quality of the glass. Until very recently the same methods have been employed for casting, annealing, grinding, and polishing that have been in use for years. The liability of

breakage during the finishing process that has attended the attempts to cast extremely large-sized plates, has resulted in a very great reduction in the average size of finished plates. The use of smaller pots, casting smaller and thinner plates for annealing in lehrs, and the adoption of new machinery for grinding and polishing, will undoubtedly result in a considerable decrease in the cost per square foot, and an increase in average size of finished plates, along with a material decrease in undesirable small sizes. A few large pots will be sufficient to supply the demand for extremely large sizes. In the manufacture of plate glass, the use of tank melting furnaces in connection with fining-pot-furnaces, is likely to appear in the near future, and the size of the plates cast can then be regulated at will. The possibilities of such a process in connection with the continuous lehr, can scarcely be estimated. The introduction of the continuous lehr, has largely reduced the high ratio formerly existing between cost of construction and capacity of plate-glass factories, and has already resulted in the entrance of 6 new companies, into the field; 4 of the projected factories being in Pennsylvania, and 1 each in Michigan and Illinois.

Cathedral Glass.—There were 8,846,361 square feet of cathedral glass manufactured in 1900, valued at \$567,252, compared with 2,773,824 square feet in 1890, valued at \$279,407, an increase in quantity of 218.9 per cent, and in value of 103 per cent. The quality of this product has been brought to such perfection, that not only has the domestic market been largely supplied, but a good export trade has been developed with Germany, England, and France. The superiority of colors is increasing the demand for American cathedral or opalescent glass, from the leading foreign art centers. During the census year, 4 establishments in New York, Indiana, and Illinois reported export shipments direct from factories to the value of \$13,432.

Wire Glass.—The manufacture of wire glass has been established in the United States on a firm basis during the last decade, and it is probable that this branch of the building glass industry will reach large proportions in the next few years. The quantity manufactured during the census year was 1,295,504 square feet, valued at \$129,051. During the year several shipments were made to England, but exact details could not be secured. The industry is yet in its infancy. Wire glass, which is made by casting two sheets of glass with a wire net imbedded between them, has been recognized as a perfect fire retardant, especially adapted for partitions, fire shutters, skylights, and glazing in all places subject to the stress of fire or storm. It is manufactured by 4 establishments, 3 in Pennsylvania and 1 in Missouri.

Skylight Glass, etc.—Although no statistics of skylight glass are shown in the report on glass manufacture at the Eleventh Census, it can be stated that the manufacture of this product has considerably increased, reaching 3,679,694 square feet, valued at \$165,086, in 1900.

Nearly all the plate-glass establishments make a specialty of its manufacture and 3 separate establishments produce it almost exclusively. The export trade in this glass is developing in an encouraging manner. The production of bent glass, for store fronts, show cases, etc., is becoming a prominent feature in connection with the production of plate glass, and there are several establishments, in addition, exclusively engaged in this business, which obtain the plate and window glass sheets from the factories and rework them, so are not included in this report. Of the 9 bending ovens included in this report, 5 are in Indiana and 4 in Pennsylvania. Within a few years the manufacture of glass tile has been introduced in this country on an extensive scale. One establishment is making it exclusively, while several others report it as a side line. Its use as a perfect sanitary wall, ceiling, and floor material gives promise of a large growth in this branch of glass manufacture.

Window Glass.—During the last decade a very great improvement has been made in the manufacture of window glass in the United States. This has been brought about by the introduction of the continuous tank furnace for melting the crude materials, in preference to the pot furnace which had been used exclusively since the start of the industry in this country in the early colonial days. Separate statistics of tank furnaces are not shown in the report on glass manufacture at the census of 1890, the tank prior to that date being largely an experiment in this country and in such limited use as to be deemed unworthy of special note at that census. At that time, however, the tank furnace was in successful use in Europe, especially in Belgium. The successful introduction of the tank furnace in the United States occurred at Jeannette, Pa., in 1888, and from 1890 it has been steadily displacing the pot furnace, until in 1900, 54.5 per cent of the capacity of active window-glass factories was contained in tank furnaces. The adoption of the tank has given the window-glass industry a permanency that was lacking when pot furnaces were used exclusively, and when the cost of construction was not great enough to prevent the ready abandonment of a plant for a more advantageous location. While the tank melting system is much more economical than the pot-furnace system, the cost of installation and other factory equipment is much greater. As a result the location of the tank factory is more apt to be selected with respect to permanency than is the case with the pot-furnace factory. The operation of tank furnaces by gas produced from coal has proven very satisfactory, both as to the quality of glass produced and cheapness of cost, indicating, in view of the failing supply of natural gas, the fuel likely soon to be in most general use.

The census year covered a portion of a period of great activity in window glass factory construction on a large and permanent scale, an activity possibly the

greatest in the history of the industry. For several years prior to 1900 the establishments operating the largest proportion of the capacity had been getting into closer relations as to regulation of prices and factory operation, resulting in the more or less constant maintenance of an exceptionally good price list. These high prices attracted new capital into the field, and during the census year there were over 30 factories reported which were built within two years. At the close of the census year about 30 window-glass factories were either building or definitely planned, notwithstanding the fact that during the year a close combination of establishments, controlling about 65 per cent of the total capacity, had been effected and prices had been sharply cut to discourage further erection of factories.

In 1900 there were 100 establishments reported as manufacturing window glass, an increase of 19 per cent over the number reported in 1890, and 104.1 per cent over the number reported in 1880. Only 19 more melting furnaces were reported in 1900 than were reported in 1890, but, owing to the greater capacity of the tank, the gain in total pot capacity was 87 per cent. In 1900 there were 165 melting furnaces reported, with a total capacity of 2,429 pots; 146 furnaces of a total capacity of 1,299 pots in 1890; and 76 furnaces with a capacity of 665 pots in 1880; showing a gain since then of 117.1 per cent in number of furnaces, and 265.3 per cent in pot capacity. In 1900 the production was 4,341,282 boxes, valued at \$10,879,355; in 1890, 3,768,884 boxes, valued at \$9,058,802; and in 1880, 1,864,734 boxes, valued at \$5,047,313. There is indicated an increase of 15.2 per cent for 1900 over 1890 in the number of boxes produced, and an increase of 20.1 per cent in the total value of products. Compared with 1880, the number of boxes produced in 1900 increased 132.8 per cent, and the total value of product increased 115.5 per cent. The average value of a box of window glass (50 square feet), according to the census returns in 1900 was \$2.51; in 1890, \$2.40; and in 1880, \$2.71.

Of the 165 furnaces with a total capacity of 2,429 pots reported in 1900, 36 were tank furnaces of a total capacity of 1,327 pots and 129 were pot furnaces that contained 1,102 pots, a decrease from the number of pot furnaces and their total capacity as reported in 1890, of 11.6 per cent and 15.2 per cent, respectively. The great increase in capacity in 1900 over 1890 is confined entirely to the tank furnace, but the total production of 1900 compared with 1890 is not in keeping with this increase, owing to the greatly restricted operation of the factories in 1900, due to a "fire" averaging about six months as against a "fire" of ten months in 1890.

The distribution of the window glass capacity of active establishments in furnaces and pot capacity for

1900 is shown in the following statement, by states, in the order of their importance in capacity:

STATES.	Number of establishments.	Total number of furnaces.	Total pot capacity.	Number of tank furnaces.	Pot capacity.	Number of pot furnaces.	Number of pots.
United States.	100	165	2,429	36	1,827	129	1,102
Indiana	46	88	1,109	17	601	66	508
Pennsylvania	32	48	960	14	588	34	372
Ohio	6	10	128	2	66	8	62
New Jersey	4	6	96	3	72	3	24
New York	5	5	40	.....	.....	5	40
Maryland	2	5	28	.....	.....	5	28
West Virginia	2	3	22	.....	.....	3	22
Delaware	1	2	16	.....	.....	2	16
Massachusetts	1	2	18	.....	.....	2	18
Illinois	1	1	12	.....	.....	1	12

The bulk of the capacity of Indiana was in the counties of Grant, Blackford, Madison, Delaware, and Jay, located in the "gas belt." The capacity in Pennsylvania was largely confined to the Pittsburg district and McKean county. The Ohio plants were at Barnesville, Lancaster, Findlay, and Quaker City. The largest proportion of the capacity located in New Jersey was in Cumberland county. In New York there were 5 factories, 3 of which were in Ithaca, and 1 each in Canastota and Durhamville. The 2 factories in Maryland were located in Baltimore. There was 1 factory in Delaware, located at Wilmington. The only plant in Massachusetts, which was originally established in 1853, was at Berkshire. About 75 per cent of the total capacity was controlled from Pittsburg, Pa., the headquarters of the American Window Glass Company, and about ten other companies. The former owned 39 plants during the census year.

At the close of the census year there was either building or definitely planned new capacity amounting to over 600 pots. Over 100 of these new pots were located in West Virginia; nearly 250 in the district of McKean county, Pa.; about 75 in the coal fields of Illinois and Indiana; 75 in southern New Jersey; and about 75 in the "gas belt" of Indiana.

One feature of the manufacture during the census year was the notable scarcity of skilled workmen. This scarcity, together with the increase in the capacity of the plants, made the total capacity greatly exceed the supply of skilled workmen available for its operation in the four divisions of the work, gathering, blowing, flattening, and cutting. The supply of workmen was about sufficient to operate 2,000 pots, and owing to the strong organization of the men and their strict rules of admission, no considerable relief was possible. The result was that the skilled workmen dominated the industry as seldom before in the history of the trade. The wage scales were the highest in years, and most profitable inducements were offered in addition by manufacturers to secure men for their plants. Every window-glass factory in the country operates under union rules, and the wage scales are settled for each

"fire" at conferences of committees representing the manufacturers and the union.

The 5 companies of a "miscellaneous" character shown in Table 18 were all cooperative and engaged in the manufacture of window glass, most of them having been established within the census year, and were financially supported by the union, which loaned money proportioned on the pot capacity of each plant. There were 2 establishments of this character reported in the pressed and blown ware and bottle and jar branch of the industry. It should be stated, in this connection, that there were in the glass industry in addition 9 incorporated establishments of a cooperative character operating under charters, which in all the tables are included under the head of corporations. They are in all essential particulars cooperative associations. This movement toward cooperation arose from the desire to secure more work during the year, the capacity of the factories having been for some time so much in excess of current consumption that the "run" of the factories had been getting less each year, averaging about six months where it was formerly ten. The past record of cooperation in the window glass industry of the United States has been unsatisfactory, all going well as long as the market conditions were good, but financial ruin usually appearing with any depression in the trade. The indications at present are very favorable for cooperative manufacture, and it will probably spread very rapidly in the industry in the near future. The greatest impetus it receives comes from the scarcity of workmen, which is leading manufacturers to organize companies in which a large share of the stock is held by the workmen, who are thus less likely to be tempted away by offers from other manufacturers.

Along with these quasi-cooperative companies many real cooperative companies, composed entirely of the men in the factory, are being established, especially among the Belgian workmen, who form a considerable proportion of the entire working force. The window-glass workers compose the only body of organized workmen in the building-glass manufacturing industry of this country, there being no organization among the plate-glass workers, from whom very little skill is required, machinery doing practically all the work in the factory.

The question of machinery is beginning to agitate the window-glass industry. So far, practically the entire process of manufacture requires skilled hand labor. The growing scarcity of workmen has stimulated efforts to perfect a mechanical process which will do the work now done by the gatherer and blower, and it is probable that eventually the smaller sizes of window glass will be successfully manufactured by machinery.

The average normal consumption of window glass in the United States is estimated at 5,400,000 boxes a year. A considerable portion of this demand is supplied by imported glass, chiefly from Belgium. This market

has for years received the surplus window glass of that country, and any advance in American prices at once results in increased importations. The 50-foot box of single strength foreign glass weighs about sixty-two and one-half pounds, and the 50-foot box of double strength, about ninety-two and one-half pounds. In reducing the number of pounds of imported glass to boxes, the average weight of a box is placed at 70 pounds, and it is estimated that 25 per cent of the total glass imported is double strength. The total importation of window glass for the year ending June 30, 1900, was 51,343,339 pounds, or 733,476 boxes, valued at \$1,555,924. There were imported 47,202,267 pounds in 1899; 38,908,992 pounds in 1898; 55,961,813 pounds in 1897; 53,182,301 pounds in 1896; 40,786,279 pounds in 1895; 52,437,068 pounds in 1894; 63,715,989 pounds in 1893; 72,682,127 pounds in 1892; 58,932,738 pounds

in 1891; and 73,112,550 pounds in 1890. A strike, which was threatened in the Belgian factories at the close of 1900, caused a sharp decrease in the importation of window glass in 1901. The quantity imported during the year ending June 30, 1901, was 27,285,607 pounds.

The American window glass exported during the year ending June 30, 1900, was valued at \$36,218, and in 1899 at \$32,690. The domestic glass can not compete with the cheaper foreign glass, yet an increasing quantity of American window glass is going into Mexico, Canada, and the West Indies.

PRESSED AND BLOWN GLASS AND BOTTLES AND JARS.

Table 8 presents comparative statistics, by states, of the manufacture of pressed and blown glassware and bottles and jars, for 1890 and 1900.

TABLE 8.—COMPARATIVE STATISTICS, PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1890 AND 1900.

STATES.	Year.	Number of establishments.	Capital.	SALARIED OFFICIALS, CLERKS, ETC.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.							
				Number.	Salaries.	Total.		Men, 16 years and over.		Women, 16 years and over.		Children, under 16 years.	
						Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.
United States.....	1890 1890	231 194	\$94,806,781 22,613,274	1,653 1803	\$1,980,393 1,894,449	40,916 32,910	\$18,055,037 13,726,058	30,372 24,431	\$15,901,620 12,472,386	3,509 1,818	\$835,100 311,652	7,085 6,561	\$1,818,317 942,020
Illinois.....	1900 1890	5 8	2,143,658 1,353,978	71 28	106,600 40,210	3,291 2,291	1,615,786 937,515	2,594 1,747	1,491,391 871,420	148 20	28,456 3,860	549 524	95,939 62,235
Indiana.....	1900 1890	59 10	5,694,974 659,468	285 27	375,122 80,305	9,103 1,480	3,974,228 554,610	7,002 1,184	3,557,923 614,903	634 180	129,808 21,951	1,467 166	286,497 17,766
Maryland.....	1900 1890	5 5	479,534 371,205	28 10	36,576 9,768	657 762	275,354 358,783	477 448	249,756 317,005	54 24	8,673 6,864	126 290	16,925 34,914
Massachusetts.....	1900 1890	4 4	255,949	38	27,660	375	179,329	331	169,891	19	4,392	25	5,046
New Jersey.....	1900 1890	22 22	5,178,672 2,776,971	309 130	278,634 116,331	5,153 4,606	2,299,500 2,009,916	4,136 3,553	2,115,061 1,888,694	170 42	32,726 8,405	847 1,011	161,713 112,817
New York.....	1900 1890	20 21	1,908,799 1,507,891	106 45	124,538 52,400	2,328 2,505	1,140,973 1,054,934	1,975 1,869	1,075,992 952,903	78 92	17,831 17,025	280 544	47,150 35,006
Ohio.....	1900 1890	21 37	3,412,379 2,979,987	174 163	226,459 171,519	4,069 5,134	1,691,378 2,037,462	3,028 3,762	1,468,952 1,836,233	405 538	96,017 74,227	636 844	126,409 126,992
Pennsylvania.....	1900 1890	78 71	13,626,067 10,743,199	535 320	675,368 378,488	12,961 13,111	5,580,771 5,469,828	3,768 9,652	4,658,460 4,898,848	1,526 699	409,349 139,956	2,667 2,760	512,962 431,024
West Virginia.....	1900 1890	14 7	1,265,624 825,313	80 34	98,016 46,946	1,886 1,371	734,676 511,079	1,258 970	603,817 446,349	468 190	103,748 32,632	160 211	27,111 32,093
All other states ²	1900 1890	8 13	841,125 1,395,267	27 46	36,420 53,482	1,093 1,650	563,042 791,941	803 1,306	510,377 746,081	12 33	4,100 6,732	278 311	48,565 39,173

¹ Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See Table 14.)
² Included in "a other states."
³ Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Georgia, 2; Kentucky, 2; Maryland, 2; Massachusetts, 2; Missouri, 2; Wisconsin, 1.

TABLE 8.—COMPARATIVE STATISTICS, PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1890 AND 1900—Continued.

STATES.	Year.	Miscellaneous expenses.	MATERIALS USED.										
			Aggregate Cost.	Glass sand.		Soda ash (carbonate of soda).		Salt cake (sulphate of soda).		Nitrate of soda.		Limestone.	
				Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.
United States.....	1900	\$2,222,776	\$12,051,925	403,754	\$547,948	182,279	\$1,921,405	468	\$5,765	10,156	\$311,675	30,741	\$75,177
	1890	1,198,151	7,519,450	211,536	547,094	74,062	2,390,135	2,468	42,781	6,955	274,686	6,570	18,760
Illinois.....	1900	210,329	664,858	32,778	33,231	11,942	163,694	.....	.....	440	13,720	4,815	9,912
	1890	105,387	566,905	19,378	30,267	7,059	226,608	46	389	579	18,330	2,466	9,377
Indiana.....	1900	341,500	3,262,466	119,621	139,056	40,592	579,638	213	3,214	2,279	73,368	9,082	16,895
	1890	63,257	354,529	13,036	32,704	5,041	154,757	285	8,321	263	10,190	410	320
Maryland.....	1900	22,313	120,759	2,076	3,929	1,263	19,080	.....	.....	149	5,000	118	319
	1890	15,966	139,971	6,721	20,133	927	25,170	.....	.....	230	3,371	.....	.....
Massachusetts.....	1900	13,483	130,095	1,322	6,265	189	5,217	.....	.....	24	830	.....	.....
	1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey.....	1900	229,514	1,401,980	78,497	75,688	20,015	299,245	197	1,778	1,314	21,165	8,227	24,621
	1890	75,751	944,750	34,684	60,749	12,461	368,946	1,500	22,500	263	11,189	60	120
New York.....	1900	130,936	778,842	19,843	42,344	7,449	112,153	.....	.....	525	13,113	1,545	5,205
	1890	89,366	582,180	11,996	33,099	4,505	188,003	113	1,450	232	10,797	293	587
Ohio.....	1900	136,007	1,094,688	31,856	59,199	10,406	147,128	.....	.....	1,259	39,684	1,374	3,434
	1890	196,432	1,139,651	30,975	86,624	11,110	347,333	169	2,888	1,628	59,021	1,480	1,480
Pennsylvania.....	1900	1,000,711	3,738,422	96,638	157,462	33,192	471,130	53	768	3,789	126,053	3,399	3,730
	1890	519,331	3,058,596	78,154	234,671	27,270	923,540	215	3,579	3,277	133,653	2,055	5,626
West Virginia.....	1900	109,904	557,868	9,205	12,953	2,796	42,751	.....	.....	307	10,932	325	575
	1890	40,805	277,033	5,350	20,845	2,209	77,725	.....	.....	416	15,140	.....	.....
All other states ²	1900	28,079	302,497	11,873	17,311	4,435	31,869	.....	.....	70	2,300	1,856	6,486
	1890	91,856	455,335	11,242	23,012	3,480	127,553	140	3,654	67	2,990	720	750

STATES.	Year.	MATERIALS USED—continued.											
		Lime.		Arsenic.		Manganese.		Litharge (red lead).		Potash or pearlash.		Fire clay and pot clay.	
		Cwt.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.
United States.....	1900	669,649	\$135,586	1,028,131	\$49,563	1,424,933	\$55,177	3,350,585	\$487,927	4,335,323	\$183,143	8,640,317	\$50,661
	1890	651,739	132,502	730,335	23,334	484,693	25,745	5,501,559	300,096	2,544,973	135,047	11,016,410	38,766
Illinois.....	1900	45,887	10,175	45,207	2,153	53,333	1,910	115,000	6,200	.....	.....	562,000	4,960
	1890	20,420	3,960	35,331	2,394	13,936	348	40,000	2,400	.....	.....	310,000	1,935
Indiana.....	1900	213,088	35,854	319,648	14,931	503,980	18,920	1,431,337	76,155	443,431	13,054	1,342,070	7,034
	1890	47,632	7,193	100,600	2,378	45,052	2,419	.....	.....	.....	.....	235,600	1,740
Maryland.....	1900	14,725	1,233	1,650	33	11,167	566	36,932	1,357	75,000	3,000	141,300	717
	1890	14,140	1,009	14,020	395	14,600	765	94,000	4,975	77,000	3,550	420,000	3,200
Massachusetts.....	1900	559	112	6,739	330	3,101	207	364,443	24,497	207,967	3,994	26,153	120
	1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey.....	1900	126,001	24,500	97,405	4,632	143,465	5,674	72,049	3,913	60,270	2,366	1,912,005	11,727
	1890	144,413	27,372	63,532	1,576	17,065	735	39,373	2,113	34,035	1,377	2,733,790	24,901
New York.....	1900	32,319	8,885	61,013	2,376	39,521	3,737	790,909	46,114	414,433	17,552	744,450	5,935
	1890	52,850	10,560	20,727	706	29,439	1,515	1,213,264	73,049	500,334	27,237	1,017,673	7,535
Ohio.....	1900	72,433	14,230	123,344	6,376	76,117	3,672	2,033,000	117,035	350,171	34,129	946,000	2,306
	1890	84,032	16,708	179,406	5,772	111,131	5,907	736,991	35,310	335,216	16,935	1,240,250	10,677
Pennsylvania.....	1900	127,790	34,027	235,267	13,372	437,131	16,331	3,141,027	191,563	1,932,699	31,991	2,560,394	15,990
	1890	201,322	42,744	164,114	6,117	212,410	11,742	3,036,631	167,499	1,474,093	77,440	3,493,733	27,027
West Virginia.....	1900	11,223	2,320	69,303	3,295	53,944	2,239	235,233	20,533	351,302	16,557	134,940	1,437
	1890	11,236	3,237	39,322	2,606	16,450	935	100,000	5,300	50,000	3,500	662,550	3,245
All other states ²	1900	20,564	3,760	13,500	965	32,024	1,421	.....	.....	.....	.....	271,000	335
	1890	75,039	13,719	12,233	440	24,410	779	140,750	3,445	74,300	4,453	347,314	3,456

¹Included in "all other states."²Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Georgia, 2; Kentucky, 2; Maryland, 2; Massachusetts, 2; Missouri, 2; Wisconsin, 1.

MANUFACTURES.

TABLE 8.—COMPARATIVE STATISTICS, PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1890 AND 1900—Continued.

STATES.	Year.	MATERIALS USED—continued.										PRODUCT.	
		Pots (not including those made at works).		Fuel.							All other materials, cost.		Total value.
		Number.	Cost.	Total cost.	Natural gas, cost.	Oil.		Coal.		All other fuel, cost.			
						Gallons.	Cost.	Tons.	Cost.				
United States.....	1900 1890	5,111 5,419	\$280,086 306,441	\$2,084,124 1,349,919	\$823,924 452,124	11,967,202 1,576,470	\$385,997 60,939	485,852 308,945	\$738,218 684,739	\$136,985 152,117	\$5,863,703 1,884,094	\$39,443,478 27,122,708	
Illinois.....	1900 1890	284 398	16,930 30,448	154,020 112,027	.....	1,669,301 492,072	41,084 23,300	113,475 54,781	94,232 66,403	18,704 22,324	247,953 127,382	2,810,308 1,945,790
Indiana.....	1900 1890	947 254	56,849 14,170	159,924 7,908	157,963	135	37	520 4,900	1,478 6,258	446 1,650	2,063,474 111,420	9,045,935 1,169,664	
Maryland.....	1900 1890	164 240	7,286 10,970	33,416 31,300	.....	148,396	6,234	12,315 12,766	22,089 26,974	5,093 4,386	44,278 30,073	454,633 674,900
Massachusetts.....	1900 1890	110	5,175	30,287	.....	371,867	15,619	3,416	12,782	1,886	48,061	402,258
New Jersey.....	1900 1890	301 359	11,217 12,279	415,485 265,210	.....	4,064,767	155,257	92,520 71,486	194,457 205,175	65,771 60,035	499,464 145,128	4,819,811 3,901,882
New York.....	1900 1890	143 150	7,125 6,005	184,417 151,650	9,190	1,293,521 55,944	45,603 2,664	48,190 39,707	121,302 124,027	8,322 24,959	824,381 108,987	2,410,188 2,000,842	
Ohio.....	1900 1890	863 1,152	52,861 71,172	213,633 96,167	99,404 64,579	1,250,637 33,054	31,874 1,575	48,816 33,565	78,138 27,972	4,217 2,041	400,501 382,607	3,875,661 4,073,385	
Pennsylvania.....	1900 1890	2,095 2,311	110,124 132,402	711,295 483,027	481,833 336,545	938,873 46,200	44,548 1,650	139,116 55,128	159,503 124,716	25,411 20,116	1,799,081 804,524	12,797,585 10,772,213	
West Virginia.....	1900 1890	184 170	11,199 12,222	77,423 54,885	75,534 51,000	18,650	685	1,271 3,180	1,304 2,085	..... 1,800	354,549 76,843	1,770,553 945,231
All other states ²	1900 1890	20 385	1,320 16,773	104,224 147,685	.....	1,317,055 949,200	45,156 31,750	26,213 33,462	52,933 101,129	6,135 14,806	81,966 97,121	1,056,456 1,644,693

STATES.	Year.	EQUIPMENT AND CHARACTERISTICS OF WORKS.															
		Furnaces, number.	Pots, number.	Tanks. ³		Clay-grinding mills, number.	Grinding machines, number.	Shops, number.	Glory holes, number.	Annealing ovens, number.	Lehrs, number.	Presses or presses mechanical, number.	Finishing machines, number.	Crimping machines, number.	Grinding and engraving machines, number.	Horses and mules, number.	Wagons, carts, and drays, number.
				Number.	Pot capacity.												
United States.....	1900 1890	258 369	2,811 2,908	305	3,404	8 78	20 63	3,978 2,894	1,419 880	1,540 1,600	1,025 599	964 801	140 91	494 233	137 798	317 370	314 297
Illinois.....	1900 1890	9 13	117 140	18	306	.....	.....	427 115	146 48	289 263	31 11	13 2	2	1	3 1	23 24	21 12
Indiana.....	1900 1890	43 21	529 116	99	999	1	1	1,397 77	351 32	161 45	321 43	201 8	33	169	29 4	7 7	20 6
Maryland.....	1900 1890	7 7	79 77	1	6	.....	.....	67 113	24 15	21 15	18 20	7 4	.....	50	4 17	8 5	11 4
Massachusetts.....	1900 1890	5	47	1	90	.....	.....	38	16	15	12	9	.....	5	.....	7	8
New Jersey.....	1900 1890	30 56	231 281	48	697	1 13	4 12	718 323	301 199	266 352	95 50	55 17	1	.....	22 47	92 95	104 79
New York.....	1900 1890	20 89	182 259	22	282	.....	.....	312 236	66 41	126 104	55 47	49 30	2	32	9 23	44 49	41 46
Ohio.....	1900 1890	29 55	377 621	16	171	2 10	.....	613 441	98 130	121 122	102 142	125 243	59 21	35 57	5 258	15 21	6 2
Pennsylvania.....	1900 1890	102 136	1,103 1,232	64	572	4 26	15 14	144 1,816	351 370	395 543	323 241	444 403	42 20	252 151	54 303	87 120	74 87
West Virginia.....	1900 1890	12 17	184 144	20	90	.....	.....	158 104	28 24	18 18	59 33	60 85	1	.....	10 60	5 12	5 12
All other states ²	1900 1890	1 20	12 138	16	191	.....	.....	104 169	43 21	128 138	9 12	1 9	.....	.....	1 85	29 37	18 29

¹Included in "all other states."
²Includes establishments distributed as follows: 1900—California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1. 1890—California, 1; Colorado, 1; Georgia, 2; Kentucky, 2; Maryland, 2; Massachusetts, 2; Missouri, 2; Wisconsin, 1.
³Not reported in 1890.

Table 8 shows that there were 231 establishments engaged in the manufacture of pressed and blown ware and bottles and jars during the census year, as compared with 194 in 1890, an increase of 19.1 per cent. Of the number in operation in the census year, 84 manufactured pressed and blown flint and lime glassware, such as tableware, jellies, common tumblers, goblets, lamps, chimneys, lantern globes, shades, globes, gas and electric lighting goods, blown tumblers, stem ware, bar ware, opal ware, cut glass, etc. The remaining 147 establishments manufactured bottles and jars in every variety of flint, green, and amber glass. As several establishments had products in both of the above classes and a fair division of their business in each branch could not be made, it was necessary to consolidate the reports of the two divisions. The total value of pressed and blown ware and bottles and jars in 1900 was 45.4 per cent in excess of that reported in 1890, the totals being \$39,443,478 and \$27,122,708, respectively. Of the total value of pressed and blown ware and bottles and jars in 1900, 55.9 per cent was the value of bottles and jars and 44.1 per cent that of pressed and blown ware, as shown in Table 14. Of the total value of all glass manufactured during the census year, the value of bottles and jars was 38.3 per cent and that of pressed and blown ware, 30.2 per cent.

Pennsylvania ranks first with 32.4 per cent of the total value of products in the manufacture of pressed and blown ware and bottles and jars in 1900. It was first also in 1890, with 39.7 per cent of the total value of products. Indiana, owing to its natural gas, ranked second in 1900, with 22.9 per cent, and sixth in 1890, with 4.3 per cent of the value of products. New Jersey was third in both 1900 and 1890, with 12.2 and 14.4 per cent of the value of products, respectively. Ohio was in fourth place in 1900, with 9.8 per cent of the value of products, but in 1890 was second, by reason of its gas fields, with 15 per cent of the total value of products. Illinois in 1900 retained the rank held in 1890, fifth place, while New York dropped from fourth place in 1890 to sixth place in 1900, on account of the western movement of the factories during the last decade. Reference to Table 14 shows that Pennsylvania leads in the production of pressed and blown ware, reporting 49.5 per cent of the total value of products, while Ohio and Indiana, the next two in rank, report 16 per cent and 15.8 per cent, respectively. West Virginia and New York report 8.1 per cent and 6.9 per cent, respectively. Indiana was the leading state in 1900 in the manufacture of bottles and jars, showing 29.2 per cent of the total value of products; New Jersey, 20.5 per cent; Pennsylvania, 19.2 per cent; Illinois, 12.4 per cent; New York, 5.5 per cent; and Ohio, 4.9 per cent.

The number of establishments reported in 1900 as engaged in the manufacture of pressed and blown lime and flint glassware and bottles and jars was 65.1 per cent of the total number of glass-manufacturing estab-

lishments of all kinds. In 1890 they were 66 per cent of the total number. The amount of capital invested in this branch of the industry in 1900 showed an increase of 53.9 per cent over 1890. The average number of wage-earners employed in 1900 was 24.3 per cent greater than in 1890, while the total amount of wages paid showed an increase of 31.5 per cent over 1890. There was an increase of 24.3 per cent in the average number of men employed and 27.5 per cent in their wages; the number of women increased 93 per cent and their wages 168 per cent. The increase in the number of women employed was due largely to the development of the manufacture of decorated ware during the last decade, giving employment to many young women. The average number of boys (practically all children in glass factories are boys) increased only 5.6 per cent and their wages 39.9 per cent. The small increase in the number of boys between 1890 and 1900 was due largely to the strict enforcement of the truant school laws in the principal glass-manufacturing states, which caused a great scarcity of boys, particularly in the bottle factories, and also largely accounted for the increase of 39.9 per cent in wages. The difficulty of obtaining boys is confined to establishments making pressed and blown ware and bottles and jars, practically none being employed in building-glass factories. Their chief duty is to carry the ware from the blower or presser to the annealing department and to attend to the molds, important items in the operation of the factory, so that their absence causes a general curtailment of production.

One result of this state of affairs was a general effort to invent means for dispensing with boy labor. One apparently practicable plan to this end is the use of a portable sheet-iron box or oven, capable of being kept at a satisfactory temperature, into which the ware is placed as it comes from the mold. When the "iron boy" is filled, two laborers carry it to the annealing department and unload the ware into the annealing ovens or lehrs. In this way, it is claimed, several laborers can handle the production of the factory with as much speed and at less cost than when boys are employed. As a result of a recent scarcity, the plan of employing young women or girls was agitated, but this aroused such a storm of indignant protest from all workers that it was never put into operation.

The total cost of materials used in 1900 in pressed and blown ware and bottle and jar manufacture was 60.3 per cent greater than in 1890. The total cost of fuel reported in 1900 is 54.4 per cent in excess of the total reported in 1890, the reported value of natural gas used being 82.2 per cent greater; however, a number of establishments owning their source of supply in 1890 and 1900 made practically no report of cost for gas fuel, but charged the expense against cost of maintenance. A remarkable increase in the use of oil as a fuel is shown, the number of gallons used being 659.1

per cent greater in 1900 than in 1890, while the cost increased 533.4 per cent. The average cost per gallon in 1900 was 3.2 cents, as compared with 3.9 cents in 1890. Ninety-four and three-tenths per cent of the quantity of fuel oil reported as used in glass manufacture in 1900 was used by the factories which manufactured pressed and blown ware and bottles and jars. A large number of small tanks operated with fuel oil, and a large quantity was used in the glory holes, the number of which in the entire industry in 1900 was 61.3 per cent in excess of the number reported in 1890. There was an increase of 57.3 per cent in the quantity of coal used and an increase of only 7.8 per cent in the cost. The average cost per ton in 1900 was \$1.52, as compared with \$2 22 per ton in 1890. The increased use of the tank furnace, with coal-gas producers using a cheap grade of slack coal, was the cause in a large measure of this decided decline in the average cost per ton.

The total number of furnaces in this branch of glass manufacture in 1900 shows an increase of 52.6 per cent over the number reported in 1890, and the total pot capacity increased 113.7 per cent; of this capacity, 54.8 per cent is contained in continuous and day or intermittent tank furnaces, which were of insignificant number prior to 1890. The use of the continuous tank in this branch of the industry is confined almost entirely to the bottle and jar trade, only 10 being reported in the pressed and blown ware establishments. Bottles of all kinds are being made from the continuous tank, and the bulk of the fruit jar and beer bottle production is made in this manner. Within the last few years flint glass for bottles and jars of such a fair quality has been made in the tank furnace that, taken in connection with the cheaper cost of production and the increased output, flint glass made in tanks for bottleware is rapidly superseding the pot-made flint glass. The adoption of the tank for manufacturing flint-glass bottles has been so general that at the close of the census year the flint-glass bottle blowers, numbering over 2,000, who since 1878 had been joined in a trades union with workmen in 13 other branches of the flint-glass trade, were preparing to leave that association and join with the green bottle blowers' union. This step was finally taken one year later by a large number.

A small decrease in the total number of annealing ovens in use in pressed and blown ware and bottle and jar manufacture was reported in 1900 as compared with 1890, and at the same time the number of annealing lehrs increased 71.1 per cent, showing that the annealing oven is being displaced by the faster and more economical lehr. The principle of the oven method of annealing is the gradual reduction of the heat, while the lehr method is based on the principle of gradually withdrawing the glass from the heat. The new method lends itself more readily to scientific exactness in securing results and, being continuous in operation, makes it

possible to handle the increased output of the factory in much less time and at smaller cost.

The manufacture of bottles and jars is the oldest branch of the glass industry in this country, the first glass factory, at Jamestown, Va., in 1608, probably operating exclusively on bottles. It has always formed a prominent part of the industry and in the last decade has made greater progress than any other branch of glass manufacture. The tank furnace, machinery, and improved factory equipments and facilities have resulted in a large increase in the value of products.

Specialization is the prevailing characteristic. A few years ago it was customary for each establishment to manufacture a large variety of ware, and the workman as a rule was accustomed to make a little of everything; but it is now the tendency to restrict the output of the factory to a particular article, and the workman is an expert in one branch of his trade, the general workman having given way to the specialist capable of maintaining the highest speed. This specializing tendency is particularly marked in the manufacture of fruit jars and beer bottles. For years bottles were made in connection with window glass from the same furnace. A survival of this is present in the trade to-day with 5 establishments, manufacturing both window glass and bottles; separate furnaces are used, however.

In no branch of the glass industry has the use of machinery made so great a change as in bottle and jar manufacture during the last decade, and especially the last four years. This applies particularly to the manufacture of fruit jars and wide-mouth ware, such as vaseline jars, jam jars, etc. Prior to 1890 the manufacture of machine-made wide-mouth bottles or jars was largely experimental, and practically no fruit jars had been made by machinery. Since that date the enormous production of small wide-mouth articles, such as vaseline jars, of which one establishment in New York uses 10,000,000 yearly, has been made almost entirely by machines, while fully 90 per cent of the fruit jars are machine-made, and it is only a question of a very short time until the fruit jar will be made exclusively in this manner. The results so far attained indicate that in a few years the bulk of the entire wide-mouth bottle production will be made by machinery.

Prior to the use of machinery, the method of manufacture of wide-mouth ware was to gather the glass from the furnace on a blowpipe, forming it to a suitable preliminary shape in a block or on a marver, and then inserting the glass in a mold and blowing to the desired form. After separating the glass from the blowpipe, a ragged edge of superfluous glass remained attached to the neck of the article, which had to be chipped and ground off to make the product salable. The manufacture of the Mason fruit jar, which since it was patented, in 1858, has constituted 90 per cent of the fruit jar production, has been most completely revolutionized by machinery. Prior to 1896 the glass was gath-

ered from the furnace upon a blowpipe, was then blocked or rolled in a hollow block to get a preliminary shape, then swung by the blower and blown up, rolled on a flat slab or marver, and again blown until it was just large enough to admit of being inserted in the blow mold. The mass of glass was then put into the mold and blown up, so as to completely fill the mold and form a collar of surplus glass extending above the top of the jar about an inch and a quarter. Above this collar was the remainder of a thin bubble into which the blower had formed the glass outside the mold so as to separate it from the blowpipe. This collar and bubble constituted the "blow-over," which had to be removed before the jar was marketable. After being annealed the jar was taken by a workman who, with a file, chipped off most of the "blow-over" and then filed it down as smooth as possible, leaving about one-sixteenth of an inch of the collar remaining, which was finally removed from the jar by the grinding machine. Then the jar had to receive a thorough washing by hand to remove all particles of broken glass and sand resulting from the chipping and grinding. After being carefully dried, the jar was at last ready to pack. The speed with which it was necessary to perform the operations of chipping, grinding, washing, and drying made the risk of breakage great, being estimated at the rate of from 8 to 20 per cent.

By the use of machinery the costly "blow-over" is avoided by first pressing the neck of the jar to finished form and then forming the body of the jar by blowing, so that when the jar leaves the blow mold to be annealed it is, so far as form is concerned, a marketable article. The process patented July 11, 1882, by Philip Arbogast, of Pittsburg, Pa., has been the basis for all machinery used in the manufacture of jars and wide-mouth bottles. He employed two separate molds, a press mold and a blow mold. Sufficient glass to make the desired article was taken from the furnace on a solid rod or punty and dropped into the press mold, the required quantity being separated from the mass on the punty by shears in the hands of a workman. A lever operated by the workman then brought down a plunger into the mold, pressing the mouth or neck of the article to finished form and pressing a wind cavity in the dependent mass of glass to aid in the blowing operation. The plunger being withdrawn, the mold was opened, and the ring inclosing the pressed neck with the dependent mass of glass was carried to the blow mold and inserted, after which the body of the article was blown up to the desired form. From 1884 to 1893 this process was followed in a small way on large candy and druggists' jars, wide-mouth bottles, vaseline and jam jars, milk jars, and tableware, such as bowls, pitchers, sugars, and creams, but the principal products were large drug and candy jars, which, after having the necks pressed to the finished form, were taken out of the press mold and greatly increased in size by manipulation of the blower

before being placed in the blow mold. In 1893 the process began to be more extensively used on vaseline jars.

The idea of dispensing with the manual operation of transferring the glass from one mold to another was patented in England in 1886, both molds being combined into one by the use of sliding parts. About the same time the idea of placing a series of molds on a revolving table was also patented in that country, and patents were granted in the United States in 1889 on both devices, but they were never put into practical use. In 1896 an American combined the consolidated mold and rotary table. On a rotating table is placed a series of five separate, duplicate, double molds, each mold containing an outer blow section having a ring integral with it in which the neck of the article is pressed, and a telescopic press section rising within the blow section and receiving the glass, forming, with the neck of the blow section, a press mold. The glass is dropped into the combined mold when in this press mold position, and the table rotated, bringing the mold under the plunger, which enters it and presses the neck, and wind cavity into the dependent mass of glass. The plunger is withdrawn, and another rotation of the table brings the mold under the blow stem, the telescopic press section of the combined mold having dropped in the meantime, exposing the glass blank within the blow section. The bottom plate is inserted and the air admitted to expand the glass blank to the form of the blow mold. The next rotation of the table brings the mold to where it is opened by a boy, and the finished article is taken out and removed to the annealing oven.

All of the above operations are performed simultaneously, a finished article being produced at each rotation of the table. On such a machine the first commercially successful machine-made Mason fruit jar was manufactured in July, 1896, at the plant of the Atlas Glass Company at Washington, Pa. The numerous jar and wide-mouth bottle machines now in use have either separate blow and press molds arranged near together on a revolving table so that the shifting of the glass from one to the other is almost instantaneous, or have the molds combined in one. In all, the basic principle is the pressing of the finished neck and the subsequent blowing of the body. Compressed air for blowing and electricity for motive power have added much to the speed of the operation. The machine has a much greater productive capacity than is possible by the old hand method of blowing, and has reduced the cost of manufacture more than a third. Loss by breakage has been reduced to a minimum, while the finish of the ware is far superior to that of the handmade article.

So far, the manufacture of narrow neck bottle ware by machinery is not beyond the experimental stage in this country, although commercial success is claimed in Germany and Russia. The claim is made by the best authorities that the manufacture of narrow neck bot-

tles by machinery will soon be perfected and become as general as the mechanical production of wide-mouth ware. The method employed at present in making narrow neck bottles is to gather a suitable amount of glass from the furnace on the blowpipe, to roll it on a marver or turn in a block, to swing and blow and again roll on the marver to give it the proper form for insertion in the mold, where it is blown, forming the body and neck of the bottle. The article is then taken from the mold and carried to the glory hole, where the top of the neck is reheated and the ring or lip of the bottle neck is formed by the workman with a finishing tool, after which the bottle is ready for annealing. The greatest advance made so far in the mechanical production of narrow neck ware has been in the finishing process, although the finishing machine, as yet, is used to but a limited extent.

The number of fruit jars reported in 1900 was 789,298 gross of different sizes—pints, quarts, and half gallons—valued at \$2,935,036. It is estimated that about 90 per cent of these were the Mason patent jar, which has a screw threaded neck for a metallic cap which presses down a rubber band on the shoulder of the jar, making a perfect seal. The other jars manufactured were more expensive kinds with special sealing devices, of which that with an all-glass top was the favorite. There were 34 establishments engaged in the manufacture of fruit jars during the census year, 6 of which made that class of ware exclusively. The largest fruit jar plant in the world, with a daily capacity of 240,000 jars, all machine-made, is in Indiana. Comparison with the statistics of the last two censuses shows a great development in this branch of the industry, caused principally by the introduction of the continuous tank in the last decade and the adoption of machinery within the last four years. In 1890, 268,978 gross of fruit jars were reported, valued at \$1,390,430. There was an increase of 193.4 per cent in the number manufactured in 1900 over 1890. The average value per gross in 1900 was \$3.72 as compared with \$5.17 in 1890, a decrease of 28 per cent in the value per gross.

The statistics of fruit jars manufactured at the census of 1880 are incomplete, yet the total of 148,271 gross reported for Pennsylvania, New York, and New Jersey probably comprised very nearly the production of the entire country. The increase in the quantity manufactured in 1900 over 1880 was 432.3 per cent. No fruit jars were reported in Indiana in 1880; but this state headed the list in 1890 with 83,270 gross, valued at \$440,657, or 31 per cent of the total production, and also in 1900 with 559,549 gross, valued at \$2,106,250, or 70.9 per cent of the total production. Pennsylvania, which was first in 1880 in the manufacture of fruit jars, 67,770 gross having been reported, was third in 1890, with a product of 47,250 gross, valued at \$233,125, and second in 1900, with 115,000 gross, valued at \$436,104. Ohio was second in the manufacture of fruit jars in 1890

by reason of the discovery of natural gas, 60,726 gross, valued at \$296,065, having been reported, while in 1900 the number had dwindled to 2,000 gross of a special kind, valued at \$8,000. In 1880 there were 51,749 gross reported as manufactured in New Jersey; in 1890, 33,406 gross, valued at \$181,410; and in 1900 this state reached third place, with 61,871 gross, valued at \$192,467. In New York there were 28,752 gross manufactured in 1880; in 1890 there were reported 9,500 gross, valued at \$55,000; and 31,235 gross, valued at \$128,965, in 1900, an increase in the number manufactured of 228.8 per cent over 1890. The statistics for Illinois show a large decrease in fruit jars manufactured since 1890, the number reported in 1900 being 1,500 gross, valued at \$9,000, compared with 20,750 gross in 1890, valued at \$103,798. In West Virginia, from which no fruit jars were reported in either 1880 or 1890, there were manufactured 14,643 gross, valued at \$43,750, in 1900.

At the close of the census year large quantities of fruit jars, roughly estimated at 340,000 gross, were being held in stock and were controlled by a selling agency formed among the principal manufacturers. A large portion of this stock was held by one firm, which had thousands of jars stacked in an open field. This stock had accumulated for several years and was held in prospect of the approaching failure of the natural gas and the consequent advance in prices.

The manufacture of prescription bottles, vials, and druggists' ware was carried on by 77 establishments in 1900, several of the largest factories in the country being operated almost exclusively on this class of goods. The value of these products in 1900 was 21.5 per cent of the total value of all bottles and jars manufactured. The statistics reported in 1890 of bottles and jars manufactured are of no value for comparative purposes, as they were not complete. However, the total number of bottles reported in that year, exclusive of beer bottles, was 2,170,961 gross. The average value per gross of this class of ware in 1900 was \$1.92, which was a considerable reduction from the value per gross in 1890. This was due to the increased quantity of ware produced from the continuous tank furnace. Of the total quantity of this class of ware manufactured in the United States in 1900, 30.2 per cent was made in New Jersey, constituting 28 per cent of the total value, the average value per gross for the state being \$1.79. Indiana ranked second, with 25.7 per cent of the total quantity and 25.4 per cent of the total value of the products, the average value per gross for the state being \$1.90. Pennsylvania, by reason of much of the product of that state being of higher grade, closely followed Indiana in the value of the products, producing 25.4 per cent of the total value and 22.7 per cent of the total quantity, the average value per gross being \$2.12. In Illinois 11 per cent of the total quantity and 8.7 per cent of the total value was manufactured, the average value per gross for

the state being \$1.52. A large part of the southern trade was supplied by that state. The manufacture of homeopathic vials was carried on by 4 glass making establishments. These vials were also made during the census year in a large number of small shops where the tubing is bought and reworked. No account of these shops is taken in this report. The American prescription bottle has no superior in form and finish, and is far in advance of the ware manufactured abroad. Export shipments of this class of ware direct from factories in 1900 were reported to Canada, Australia, South and Central America, Cuba, Great Britain, France, Africa, East Indies, China, and Japan, of a total value of \$93,094, which represented only a portion of the actual exportation, as the most of the trade was done through exporting houses.

The manufacture of beer, soda, and mineral water bottles in 1900 was reported by 75 establishments in 15 states, the total value of which was \$5,075,068, or 23.4 per cent of the total value of all bottles and jars manufactured. Several establishments were employed almost exclusively in the manufacture of beer and soda bottles, the bulk of the trade being done by them. Plans were being prepared at the close of the census year for 6 new establishments to manufacture beer and soda bottles exclusively, while increases of capacity among established plants were general, nearly all being in the line of continuous tanks. Demand for ware in the census year was extraordinary, the home consumption being unusually large, while large quantities of bottles filled with beer were shipped to Cuba and the far East. The export trade in beer and soda bottles with Mexico reached its highest development during the census year, direct factory shipments aggregating 21,147 gross, valued at \$66,333, being reported for that country. The manufacture of mineral water bottles largely increased during the decade and was unusually large during the census year. By far the largest part of the production in this branch of the industry was made from the continuous tank furnace.

The general use of the tank and better facilities for the maintenance of a high rate of speed by the workmen have resulted in a great increase in the average factory output within the last ten years, yet consumption at the close of the census year was demanding still greater capacity, and prices were at a high point. In 1890 a production of 204,948 gross of beer bottles was reported, the figures probably not being complete, but showing nearly all of the country's production in that year; this was exceeded in 1900 by Illinois alone, with 4 establishments reporting. As in 1890, Illinois in 1900 was first in the manufacture of beer, soda, and mineral water bottles, with 26.3 per cent of the total value and 30.1 per cent of the total quantity manufactured in the United States. Pennsylvania ranked second in value of products, with 17.8 per cent of the total, but the quantity manufactured was only 10.9 per cent of the

total quantity. Establishments in Ohio reported 12.6 per cent of the total value and 16.2 per cent of the total number of gross, while the production in New York constituted 9.9 per cent of the total quantity and 9.3 per cent of the total value. A large percentage of the total value and quantity was reported under the head of "all other states," which came chiefly from Wisconsin and Missouri, each having a large establishment devoted to the exclusive manufacture of this class of ware. California, Colorado, Georgia, Michigan, and Virginia were the other states included under this head. New Jersey, with a production slightly less in quantity, led Indiana in the total value of beer, soda, and mineral water bottles manufactured. Following Indiana in this class of ware were Maryland, West Virginia, and Massachusetts, in the order named.

There were 81 establishments engaged in the manufacture of flasks and liquor bottles in 1900, the total value of the products being 11.1 per cent of the total value of bottles and jars manufactured, Indiana heading the list with 50.2 per cent of the total value and 61.4 per cent of the total quantity. There were several small establishments equipped with tank furnaces in this state operating exclusively on flasks with very cheap gas fuel, and cheap unorganized labor, that created considerable demoralization in prices and in the trade of the old establishments. To counteract this, the American Flint Glass Workers' Union, to which the organized flask workers belong, at the close of the census year was erecting a tank factory in Indiana to be operated exclusively on flasks, which were to be sold at prices to compete with these new firms, and thus to either force them out of the business or cause them to maintain prices and working conditions equal to those in force among organized manufacturers. This movement is unique in the history of trades unions, and is based on the principle that there is greater economy and efficiency in direct business competition than in the old method of taking men out on strike and supporting them on a relief roll. Pennsylvania was next to Indiana in the manufacture of flasks and liquor bottles, 14.5 per cent of the total quantity and 18.6 per cent of the total value being manufactured in that state. Liquor bottles and flasks were also manufactured in California, Georgia, Illinois, Maryland, Massachusetts, Michigan, New Jersey, New York, Ohio, Virginia, West Virginia, and Wisconsin.

The manufacture of milk jars or bottles is practically a development of the last decade. The demand has steadily increased, causing a corresponding increase in the furnace capacity used in the manufacture of this class of ware. The manufacture of milk jars was reported in 1900 by 31 establishments, 13 of which were located in Pennsylvania. The total value of milk jars of all sizes manufactured in 1900 was 3.4 per cent of the total value of all bottles and jars manufactured. The average value per gross for the United States was

\$4.99. The mechanical production of milk jars is commercially possible, and it is probable that a large part of the product will be made by machinery during the present decade. The manufacture of milk jars was one of the most rapidly expanding branches of the glass trade at the close of the census year, the overwhelming merits of such a package for milk becoming more widely recognized and the demand steadily increasing. Pennsylvania led the productive list, with 55.1 per cent of the total quantity and 59.6 per cent of the total value. The percentages of the total quantity and total value of milk jars manufactured in the other states in 1900, are as follows: New Jersey, 13.5 per cent of the quantity and 14.7 per cent of the value; Indiana, 13.4 per cent of the quantity and 7.6 per cent of the value; Illinois, 5.1 per cent of both quantity and value; New York, 4.7 per cent of the quantity and 4.6 per cent of the value; Ohio, 4.1 per cent of both quantity and value; West Virginia, 3.1 per cent of the quantity and 3.2 per cent of the value.

The manufacture of bottles for patent and proprietary medicines is largely confined to the states of New Jersey, Illinois, and Indiana, although 47 establishments in 8 states were reported as engaged in the manufacture of such products. The value of bottles for patent and proprietary medicines manufactured in 1900 was 12 per cent of the value of bottles and jars of all kinds reported. The combined production of New Jersey, Illinois, and Indiana was 88.6 per cent of the total quantity for the United States. Bottles of this kind are made of a cheaper grade than prescription bottles and are used in steadily increasing quantities, a large quantity being exported filled. New Jersey for a long period has been first in the manufacture of this class of ware, and in 1900 there was reported from that state 46.4 per cent of the total quantity and 53.7 per cent of the total value for the United States. From Illinois was reported 23.4 per cent of the total quantity and 19 per cent of the total value; and from Indiana 18.9 per cent of the total quantity and 14.5 per cent of the total value. Bottles for patent and proprietary medicines were also manufactured in Pennsylvania, New York, Ohio, Maryland, and Georgia.

The manufacture of bottles and jars for the packing and preserving industries, exclusive of the enormous production of fruit jars, has steadily advanced during the past decade, owing to the remarkable growth of the above interests and the increasing recognition of glass as the ideal package. In this branch of the bottle and jar industry the value of the product in 1900 was 9.8 per cent of the total value of all bottles and jars manufactured, and 45 establishments in 10 states reported. The products covered a wide range of glass food packages, the average value being \$2.70 per gross. The manufacture of machine-made ware in this line is increasing, although constituting as yet a very small proportion of the total. The 3 leading states in the

manufacture of bottles and jars for packers and preservers were New Jersey, Indiana, and Pennsylvania. In New Jersey, 35.6 per cent of the quantity and 29.3 per cent of the value of these products was manufactured; in Indiana, 31.6 per cent of the quantity and 32.4 per cent of the value; and in Pennsylvania, 14.5 per cent of the quantity and 19.8 per cent of the value. Illinois followed, with 10.3 per cent of the quantity and 9.2 per cent of the value. This class of ware was also manufactured in Ohio, New York, California, West Virginia, Maryland, and Georgia; these states reporting in the order given as to quantity and value of product.

The number of demijohns and carboys manufactured in 1900 was 83,243 dozens, valued at \$206,061. The average value per dozen for the several states varied with the proportion of the state's output of the more expensive carboy or the cheaper demijohn, the average value of the carboy being about twice that of the demijohn. New Jersey was first in the value of demijohns and carboys manufactured in 1900, with 42 per cent of the total value, followed by Illinois with 23.8 per cent of the total value, Pennsylvania with 17.9 per cent, and New York with 9.2 per cent. Under the head of "all other products," bottles and jars which were not specified, valued at \$940,277, were reported. A large variety of ware was embraced under this head. During the census year the manufacture of large glass jars and retorts for laboratory use and for water coolers was successfully accomplished in this country, the process having been brought from France.

There was no such close organization of manufacturing interests in the bottle and jar industry during the census year as in the plate glass, window glass, and tableware industries. Eastern and western manufacturers of bottles have relied upon a common understanding to regulate prices, with varying success, particularly in some lines such as flasks and prescription bottles. The manufacture of beer bottles was controlled by a few firms, and very satisfactory results in keeping prices uniform were the rule. The prices of fruit jars were regulated by a selling agency agreement among controlling manufacturing interests. The workmen in both the green and flint bottle and jar trades were well organized and their rules as to duration of factory operation and a uniform scale of wages, which affected a large majority of the factories in all branches of glass manufacture, were the strongest factors in maintaining uniformity of prices. The green bottle blowers' organization, the Glass Bottle Blowers' Association, organized about 1877, is one of the best managed and most progressive trades unions in the United States, and had a membership of about 4,000 and about \$100,000 in cash in the treasury at the close of the census year. The organization of flint or prescription bottle blowers numbered about 1,500, and formed a branch of the American Flint Glass Workers' Union, one of the largest trades unions in the country. The scale of

wages and the duration of the summer stop of the factories are fixed each year at a meeting of a joint committee representing organized workers and manufacturers. The only company stores in the glass trade in 1900 were in the bottle and jar branch of the industry. There were 10 of these stores, but in only two instances were the glass workers compelled to trade with them, as had been customary a short time before, the blowers' union having conducted a successful strike chiefly against the company store system. In 1890, 20 company stores were reported, 11 in connection with factories making bottles and jars and glassware, 8 in window glass works, and 1 in the plate glass branch. In 1880 there were 27 reported, as follows: 13 in connection with factories making bottles and jars and glassware, 12 in window glass works, and 2 in the plate glass branch.

Table 9 is a statement, by states, of the number of bottles manufactured, classified by capacity.

TABLE 9.—NUMBER OF BOTTLES MANUFACTURED, CLASSIFIED BY CAPACITY, BY STATES: 1900.

STATES.	BOTTLES.		
	4-ounce and under, number of gross.	4 to 16-ounce, inclusive, number of gross.	Over 16-ounce, number of gross.
United States	2,462,694	3,055,204	1,228,719
California.....	4,600	22,486	25,187
Georgia.....	13,000	17,000	7,350
Illinois.....	428,077	430,636	289,285
Indiana.....	562,345	872,318	199,947
Maryland.....	113,898	48,969	8,969
Massachusetts.....	.....	4,865	1,561
Michigan.....	8,876	10,425	1,670
Missouri.....	.....	46,687	23,333
New Jersey.....	764,385	614,885	180,046
New York.....	57,321	196,790	254,074
Ohio.....	74,015	185,054	94,338
Pennsylvania.....	405,528	496,670	199,310
Virginia.....	34,000	22,000	9,000
West Virginia.....	1,649	34,948	6,649
Wisconsin.....	.....	42,000	28,000

It is possible that the statistics presented in the above table are not strictly accurate, as several establishments were unable to furnish more than an estimate of the number of bottles of each size manufactured. The total number of the three classes of bottles exceeds the total number reported in Tables 12 and 14 as "prescriptions, vials, and druggists' ware," "beers, sodas, and minerals," "liquors and flasks," and "patent and proprietary." This is probably accounted for by the fact that a large number of bottles included in the statement were not reported under either of the foregoing classifications, but were reported on the schedule under "all other products."

Pressed and Blown Glassware.—Pressed and blown lead and lime glassware manufactured in the United States is characterized by purity of color, excellence of design and finish, and cheapness of cost. The United States has been preeminent in the manufacture of pressed glassware ever since the invention of the process, which

occurred about 1827 at a little plant in Sandwich, Mass., as the result of a suggestion of a carpenter who knew nothing of glass manufacture. His idea that molten glass could be pressed into any desired shape was at first regarded as absurd by experienced glass manufacturers.¹ Prior to this all glassware was blown, either offhand or in a mold, which required much greater skill and more time than the pressing operation.

About 37 years after the first glass press was constructed another important discovery was made, which so improved the composition of the batch for lime glass that, in purity and brilliancy, lime glassware was made to rival the more expensive lead glassware. Lime glass had been used in Europe and England for centuries in the manufacture of window glass, bottles and jars, and common tableware, and from an early period it had been used in the United States in the manufacture of tableware. But it was so inferior in purity and luster that it could not compete with lead glass, and was restricted to the cheapest and lowest grade of ware.

In 1864, according to the authority noted above, William Leighton sr., a glass manufacturer of Wheeling, W. Va., by the substitution of bicarbonate of soda for soda ash, and a better proportion of the materials in the batch, manufactured a lime glass that equaled in beauty the finest lead glass. This placed lime glass on a basis of competition with lead glass at less than one-half the cost. The almost immediate effect was a complete revolution in the manufacture, the production of lime glass rapidly increasing, while that of lead glass for tableware was soon reduced to a comparatively small quantity. The lime glass was not only cheaper, but had to be worked quicker than the lead glass, resulting, in connection with the use of the press, in a largely increased output.

The quantity of pressed ware manufactured has been greatly increased in the last decade by the removal of the arbitrary limit placed on the number of pieces to be made in a "turn" by the worker, and by the improvement of the old-style press by adding a rotating table carrying a series of molds, and operated by steam, compressed air, or electricity. The effectiveness of these improvements has been further increased by elaborating on the old wind system for cooling molds and workers. This increase in the speed of the old press without changing its basic form, and in that of the fire polishing and finishing operation, have been the notable changes during the last twenty years.

The effort to increase rapidity of production, especially in the last decade, was the principal characteristic of the pressed-ware trade. So well has this succeeded by the use of the improved press and continuous tank, that it has resulted in a large increase in the quantity manufactured, of common tumblers and jelly glasses, cheap, unfinished tableware, common lamps, etc., and a

¹Tenth Census of the United States, "Report on Glass Manufacture," by Joseph D. Weeks, special agent, page 58.

large reduction in cost, although the best grade of pressed ware is still made on the old hand press. For years American pressed tableware has been unrivaled in brilliancy and in its close imitation of the real cut glass, the fire-polish finish being the greatest factor in this success. In beauty and variety of design, pressed tableware has equaled if not surpassed the real cut ware, new designs being produced each year in great profusion and at large cost.

During the last decade great mechanical progress has been made in the blown glass branch of the industry, but not to such an extent as in the production of fruit jars. Since 1897 a large number of thin blown tumblers have been made by machinery, and the same machine has been successfully applied to the manufacture of lamp chimneys, although trade conditions have restricted its advantages and prevented its operation in the manufacture of the latter to the extent reached on tumblers. In the manufacture of both tumblers and lamp chimneys, the machine greatly increases the output and lessens the expense of skilled labor. The machine has a circular table revolving around a central column or standard, the table carrying a series of duplicate molds, usually six. After the ball of glass has been gathered from the furnace on the blowpipe to the size required for the desired article, it is placed in the mold, which is closed, and the blowpipe held in place perpendicularly over the mold by a clamping device at the top of the machine, which engages with the upper end of the blowpipe. Over the mouthpiece of the pipe is placed a rubber hose which leads to a supply of air, furnished either by a compressing pump, or, if light pressure is required, as with some tumblers, by a fan system. The mechanical rotation of the table admits the air into the pipe, which is kept revolving, and blows up the glass in the mold until it is ready to be turned out for the finishing process. Ingenious mechanism regulates the air pressure. The entire operation is performed with great rapidity and it is claimed that the output of the machine is limited only by the ability of the workmen to supply the glass. The mechanical finishing of ware is now engaging the special attention of manufacturers, and a completely mechanical process, requiring small labor cost to perform the entire operation of finishing the ware after its removal from the blowpipe or mold, is the object sought. Manufacturers generally are of the opinion that more real progress will result from improvements in the finishing process than from further improvements in the mechanical process of making the ware. While the high-speed machine is a success on ordinary ware, both pressed and blown, the manufacture of high-grade ware seems to require the sympathetic touch of the skilled workman.

The manufacture of pressed and blown ware in 1900 was done almost entirely in Pennsylvania, Ohio, Indiana, West Virginia, and New York, only 3.7 per cent of the total value of such products being reported in

Massachusetts, Illinois, Maryland, New Jersey, and Colorado. Specialization in manufacture was carried far in many lines, particularly in the manufacture of chimneys, tumblers, and lamps. Competition in nearly all lines was very active, particularly during the latter part of the decade, creating a strong tendency toward concentration of capacity along special lines, so as to manufacture at the lowest possible cost. The more rapid and safer handling of the ware, economy of working space in the factory, and facilities and conveniences for adding to the efficiency of the working force were considerations that received the greatest attention. Competition was so intense at the opening of the census year that all previous agreements between manufacturers as to prices were useless, and consequently prices of pressed and blown ware were unusually low. This was the principal cause of the formation of two close consolidations and additional general associations for the regulation of prices. The result was a decided improvement in prices during the latter half of the year. In July, 1899, a consolidation was effected of 7 establishments which manufactured lamp chimneys exclusively, and on November 1, 1899, 19 large pressed and blown ware establishments, equipped with about one-half of the available capacity of the United States, making a general line of tableware, tumblers, and novelties, came under the control of one central company. In 1891 a similar consolidation of 13 tableware establishments, principally in the immediate neighborhood of Pittsburg, Pa., was formed, and the number of plants was increased later. During the census year this company operated only 6 factories, 3 of which were in Pittsburg.

In the early part of the census year nearly all the manufacturers of pressed and blown ware agreed in forming an association to effectively maintain prices, and so successful was this association that on many articles unusually low prices, caused by sharp competition, were succeeded by quite profitable prices, which were well maintained. The association in attaining this end enlisted the aid of the jobbers by the establishment of a liberal rebate system, similar in some respects to the plan adopted by the consolidation of window glass manufacturers in the same year, although the latter went to the extent of forming the jobbers into an incorporated body pledged to cooperate with the manufacturing interests. The several consolidated companies engaged in the manufacture of glass established their headquarters in Pittsburg, which city, although it had lost nearly all the glass factories that had made it famous as the center of American glass manufacture, controlled more completely than ever, at the close of the census year, the manufacture of glass in the United States. Pittsburg was also the headquarters of all the glass-workers' associations, except that of the green bottle blowers, which was at Philadelphia. A large majority of the skilled workmen in the pressed and blown ware

industry were members of the American Flint Glass Workers' Union; which was organized in 1878, and embraced the workmen in 14 different branches of the trade. The membership was about 7,000 and the treasury contained about \$100,000. By means of this organization the manufacture was carried on under a practically uniform wage scale and with concerted action as to factory operation.

The manufacture of tableware, which consists of pressed and blown articles in sets ranging from two or three pieces to over a hundred, of very great variety of form and size, was confined to the 4 states of Pennsylvania, Ohio, Indiana, and West Virginia, in the order named. Twenty-seven establishments reported products valued at \$2,617,784, or 15.3 per cent of the total value of all ware made in the pressed and blown division of the industry, and numbering 65,514,100 separate pieces. There was a very great variety in the value of the different kinds of ware, but the average value per 100 pieces for the United States was \$4.

In Pennsylvania 55.7 per cent of the total quantity, and 60.6 per cent of the total value, was manufactured, and the average value per 100 pieces in that state was \$4.35. A large proportion of the product for the state was manufactured in the Pittsburg district. In Ohio 23 per cent of the total quantity, and 25.5 per cent of the total value, was reported, and the average value was \$4.43 per 100 pieces. The great bulk of the product was manufactured in the valley of the Ohio River. By the substitution of glass of a cheap quality made in tanks for glass made in pots, and worked with the press at higher speed than customary, and by dispensing with the fire-polishing operation, a class of cheap unfinished tableware and other glassware was manufactured in Indiana during the closing years of the last decade. This largely accounts for the fact that only 11.1 per cent of the total value of tableware manufactured in the United States, compared with 19.3 per cent of the quantity, was made in that state. The average value per 100 pieces was \$2.31. The manufacture of tableware in West Virginia was conducted entirely along the banks of the Ohio River, and 2 per cent of the total quantity, and 2.8 per cent of the total value, was manufactured there, at an average value of \$5.48 per 100 pieces. A considerable proportion of the product was blown ware.

Considerable rivalry exists among the manufacturers of pressed tableware in the production of attractive designs and decorations. Most of the ware is in imitation of cut ware, and so highly has the art been developed that a careful examination is frequently required to detect the difference. It is the custom with a majority of the establishments to offer new designs at the opening of each year, a large amount of money being expended to secure these designs and to prepare the required molds. The profitable life of a design, unless it is unusually popular, is limited to one season, its place being taken by some new idea expected to bet-

ter catch the popular fancy. A popular design will, in one season, prove extremely profitable, while the losses on unpopular designs are so great as to make the expression of the public's favor an exceedingly interesting matter to the manufacturers. Popular favor has changed in the last decade from imitation cut ware to plain ware, and from that to highly decorated ware, but the imitation cut ware has been in most constant demand, although within the last few years colored ware and plain crystal with gold decorations have been strongly favored. Within the last half of the decade the manufacture of colored ware, to compete with the influx of imported Bohemian ware, has been assuming shape, and it seems probable that this profitable field will not much longer be left wholly undisputed to the foreign manufacturer.

Tableware has long formed a large proportion of the exports of glass from the United States, by reason of its superiority of color and design. The export branch of the business received special attention in 1900, traveling representatives having been sent through South America, Australia, and the United Kingdom, and a number of permanent agencies were established by the larger interests. For a long period large quantities of American tableware have been used in Canada, and a field of large proportions is being opened in Australia, one glass manufacturing establishment during the census year, having made a single direct shipment to that country of 10 cars, or about 1,500,000 pieces, a small part of which was common lamps. Thirteen establishments reported exports direct from factory of a total value exceeding \$100,000, to Canada, Australia, Mexico, South America, Cuba, Hawaii, England, and Germany. This represented only a small part of the total exports of tableware during the census year, as the bulk of the trade was done through exporting houses. A growing tendency has been noted on the part of the manufacturers to export direct from the factories, and foreign needs are being closely studied with a view to the increase of the export trade in the future.

Jelly glasses and pressed tumblers and goblets, 102,528,600 pieces in number, valued at \$2,007,386, were manufactured by 28 establishments in 5 states in 1900. The value of such ware was 11.8 per cent of the total value of all pressed and blown ware manufactured in the United States. The average value was 23 cents per dozen.

In Pennsylvania 36.4 per cent of the total quantity and 39.5 per cent of the total value was manufactured, and the average value for the state was 25.5 cents per dozen. The proportion manufactured in Indiana was 31.4 per cent of the total value and 35.7 per cent of the total quantity, at an average value of 21 cents per dozen. From Ohio was reported 9.6 per cent of the total value and 19.7 per cent of the total quantity, at an average value of 23 cents per dozen. The remaining 9.5 per cent of total value and 8.2 per cent of total quantity

was manufactured about equally in Maryland and West Virginia, at an average value of 27 cents per dozen. At the close of the census year two large establishments, intended solely for the manufacture of jelly glasses and tumblers, were being built in West Virginia, and a large establishment was being erected in Ohio for the manufacture of the same class of ware by machinery and methods that were expected to still further reduce the cost and increase the possible output.

At the censuses of 1880 and 1890 incomplete returns were made of the manufacture of tumblers and goblets. In 1880, 46,415 dozen "tumblers" were reported from Massachusetts, 409,713 dozen from Ohio, and 2,500,000 dozen from Pennsylvania. In 1890, 5,438,700 dozen "tumblers and goblets," valued at \$555,273, were reported as manufactured in Ohio; and 2,481,600 dozen, valued at \$780,059, in Pennsylvania. The use of jelly glasses and tumblers in the packing trade is steadily increasing and there has been a steady growth in the exports.

Lamps manufactured in 1900 numbered 807,765 dozens, valued at \$1,498,675, or \$1.86 per dozen. They were in many varieties, from the most common pressed lamps to those ornately fashioned, and their value was 8.8 per cent of the total value of all pressed and blown ware. By far the largest proportion consisted of the commonest pressed grades. The manufacture was confined to 6 states and 27 establishments, several of which made a specialty of highly decorated lamps. The largest factory in the world making decorated lamps exclusively was located in Pennsylvania. Great progress was made during the last decade in the manufacture of decorated lamps of a medium grade, and this branch of the industry is receiving increased attention.

In Pennsylvania 65.6 per cent of the total value and 56.4 per cent of the total quantity was manufactured, at an average value of \$2.16 per dozen. The largest proportion of Ohio's total product was common lamps; the quantity manufactured was 23.7 per cent of the total quantity, and the value 12.4 per cent of the total value, with an average value of 97 cents per dozen. In West Virginia, with the bulk of the production of decorated lamps, 18.4 per cent of the total value and 7.6 per cent of the total quantity was manufactured at an average value per dozen of \$4.47. The lamps manufactured in Indiana were largely of a cheap grade; the quantity manufactured was 10.1 per cent of the total quantity, and the value 2.9 per cent of the total value, at an average value of 53 cents per dozen. Lamps were manufactured also in New York and Massachusetts, the product of the former state being largely common lamps, and that of the latter a better grade of ware.

The use of the tank in lamp manufacture has made possible a considerable reduction in cost from that of the old pot-melting method which was in general use in 1890. The manufacture of pressed lamps has been steadily increasing, resulting in a large reduction in the cost of the common article.

The value of lamp chimneys manufactured in 1900 was \$2,719,583, the greatest in value of any single product reported under the pressed and blown glass branch of the industry, and was 15.9 per cent of the value of all pressed and blown glassware. The manufacture was reported in 6 states, but 90.4 per cent of the total value of products was manufactured in Indiana, Pennsylvania, and Ohio. The average value per dozen for the United States was 39 cents. Indiana led, with a product constituting 45.1 per cent of the total quantity and 44 per cent of the total value, the average value being 38 cents per dozen. Pennsylvania was second with 26.6 per cent of the total quantity and 23.5 per cent of the total value, at an average value of 35 cents per dozen. The quantity of lamp chimneys manufactured in Ohio was 21.9 per cent of the total, and the value 22.9 per cent; the average value per dozen was 42 cents. The remaining states in which lamp chimneys were manufactured were Illinois, New York, and Massachusetts. There were 27 establishments engaged in the manufacture.

A comparison of the statistics for 1900 with the incomplete statistics for 1890 and 1880 shows how the manufacture of chimneys has moved westward, following the natural gas and cheap fuel, and also gives some idea of the extent the production has been curtailed by the increased use of gas and electric light. The total number reported in 1890 was 7,534,473 dozens, valued at \$1,816,016, and distributed as follows: Ohio, 4,025,120 dozens, valued at \$541,836; Pennsylvania, 2,885,841 dozens, valued at \$1,017,639; New York, 623,512 dozens, valued at \$256,541. In 1880 the total number reported for the United States, no value being given, was 4,463,140 dozens, distributed as follows: Pennsylvania, 2,719,649 dozens; New York, 888,639 dozens; Ohio, 743,140 dozens; and Massachusetts, 111,712 dozens. No lamp chimneys were reported as manufactured in Indiana in either 1880 or 1890; this state was first, however, in 1900 in this branch of the industry, and succeeded Ohio, which was the leading state in 1890. This change in the relative positions of these two states was coincident with a similar change in the supply of natural gas. A decrease of 8.4 per cent in the total quantity manufactured in the United States is shown from 1890 to 1900, while the total value in 1900 exceeds that of 1890 by 49.8 per cent; this was due largely to the extremely low value reported for the product of Ohio in 1890, which was more than one-half of the total quantity reported at that time.

During the last decade the improvement in the manufacture of lamp chimneys was shown by better quality and a greater variety of design. There has been a large increase in the use of higher grade chimneys of special design. Special attention has been given to the package for fine grade ware, and a large number of such chimneys have, within the last few years, been packed in separate cartons, resulting in a decided improvement in appearance and in safety of shipment.

The manufacture of lamp chimneys by the blowing machine was limited to two factories in 1900, and in only one of these plants was it carried on extensively, being confined largely to a cheap class of goods. Machine-blown lamp chimneys will probably represent a large proportion of the production in the near future, although it is questioned if the higher grades of chimneys will not require hand work. During 1900 the lamp chimney market was fairly well regulated by an agreement between the largest manufacturing interests, but a number of small establishments in Indiana were causing demoralization in lime glass chimneys, or the cheap grade of goods. During the census year the tank furnace became a factor in the manufacture of the common lime glass chimneys, 4 tanks being reported. Great strides had also been taken toward improved factory equipment for handling the ware; lehrs operated by electricity, electric conveyors to take the ware from the lehr to the packer and then to the stock room or car, were among the improvements made, together with a great increase in the rapidity of the finishing operation. A good export trade has been developed in this branch of the industry. Large shipments have been made for many years by export houses, but during the census year the manufacturers renewed attempts to reach the export trade direct, and a special effort to introduce the American lamp chimney into England was successful, 66,667 dozen chimneys being reported as sent direct from factory to England during the year. The remainder of the exports that were shipped direct from the factories were sent to South America and Mexico.

Lantern globes were manufactured during the census year in 6 states by 27 establishments, and the number reported was 1,044,816 dozens, valued at \$497,021, or 2.9 per cent of the total value of all pressed and blown ware manufactured. The average value per dozen was 48 cents, the average value by states ranging from 25 cents to \$1.17 per dozen, depending upon the quality of the ware. There were two establishments employed exclusively in the manufacture of lantern globes, one in Indiana and one in West Virginia. The percentages of the product manufactured in the leading states, of the total for the United States, are as follows: Indiana, 52.4 per cent of the quantity and 35.4 per cent of the value, with an average value per dozen of 32 cents; New York, 15.5 per cent of the quantity and 38.2 per cent of the value, with an average value per dozen of \$1.17; Ohio, 13.7 per cent of the quantity and 14 per cent of the value, with an average value per dozen of 49 cents; West Virginia, 12.6 per cent of the quantity and 6.6 per cent of the value, with an average value per dozen of 25 cents; Pennsylvania, 5.6 per cent of the quantity and 5.4 per cent of the value, with an average value per dozen of 46 cents. A small proportion was manufactured also in Massachusetts. Indiana and West Virginia supplied the great bulk of the out-

put of cheap lantern globes, while New York led in the manufacture of ware of a higher grade. There were no statistics of the manufacture published at the census of 1890, but a great increase has been made during the decade. During the census year very active competition on the cheaper grades of lantern globes was developed. More than 10,000 dozen lantern globes were reported in 1900 as exported direct from the factories to Mexico and Central America; this represented but a small part of the total exportation.

The manufacture of pressed and blown shades, globes, electric bulbs, and glassware for gas and electric lighting ranked third in value of products in the pressed and blown ware branch of the industry in 1900, being 14.6 per cent of the total. The shades and globes ranged in quality from the plain pressed Welsbach gas article to the most costly and artistic products in fine plain and colored glass, richly decorated, engraved, or etched. The manufacture of glassware for the Welsbach gas light had developed to a very large extent. Electric glassware, such as incandescent bulbs and arc globes, formed a large item, although foreign competition in that line was quite active. The manufacture of gas and electric glassware has been largely a development of the last decade, and it is now one of the specialized lines of the industry. Although the increased use of gas and electricity has curtailed the use of the oil lamp in some quarters, yet a tendency has been shown toward the use of fancy lamps with highly decorated or ornamented shades and globes, more for decorative effect, probably, than real use, and this has greatly stimulated the production of globes and shades of a much higher quality in general than was ever before manufactured. The total production of shades, globes, and gas and electric goods in 1900 was manufactured in 7 states, from 3 of which, Pennsylvania, New York, and Ohio, 94.9 per cent of the total value was reported. There were 30 establishments engaged in the manufacture of these goods on a more or less extensive scale. The average value per dozen for the United States was 93 cents, the average value by states varying as the bulk of the output was cheap gas and electric ware or decorated shades and globes.

From Pennsylvania was reported 32 per cent of the total quantity and 58.1 per cent of the total value, the average value per dozen being \$1.70. Large quantities of medium-priced globes and shades, cheap gas goods, and a valuable production of globes and shades of the finest quality were manufactured in that state. In New York a large quantity of high-grade shades and globes, and a large output of electric bulbs were manufactured. The quantity of articles of this class manufactured was 11.7 per cent of the total, and the value 20.8 per cent, with an average value per dozen of \$1.66. A large number of electric bulbs was manufactured in Ohio, which was third in rank as to value of products, but was far in the lead as to quantity, with 52.3 per cent

of the total quantity reported and 16 per cent of the total value, the average value per dozen for the state being 28 cents. Shades, globes, and gas and electric goods were manufactured also in West Virginia, Massachusetts, Indiana, and New Jersey. Decorated shades and globes constituted the larger part of the product in West Virginia, and the product in Indiana was electric and gas ware, at an average value of 13 cents a dozen. Shades and globes were manufactured in Massachusetts, and in New Jersey the product was entirely electric bulbs. Great improvements have been made in the last few years in the package for shades and globes, nearly all the better grade being packed in separate cartons. The export trade has had a steady growth, but complete statistics were not obtained from the factories. A total of 44,200 dozen articles in this branch of the industry, mostly electric ware, was reported in 1900 as shipped direct from the factories to Canada, the West Indies, South America, and Australia. By far the largest proportion was exported to Canada.

Blown tumblers, stemware, and bar glasses, 6,127,367 dozen in number, were reported in 1900 by 17 establishments in 4 states. These products constituted 9.4 per cent of the value of all pressed and blown ware manufactured. The average value per dozen for the United States was 26 cents. The manufacture of this class of ware has become greatly concentrated, 94.3 per cent of the total value of products being reported from Pennsylvania and West Virginia. The percentages of the total quantity and total value manufactured in the two leading states are as follows: Pennsylvania, 57.3 per cent of the quantity and 69.3 per cent of the value, with an average value of 31 cents per dozen; West Virginia, 37.4 per cent of the quantity and 25 per cent of the value, with an average value of 17 cents per dozen. The remainder of the product was manufactured in Ohio and Indiana, the average value per dozen in Ohio being 25 cents, and in Indiana, 34 cents. The returns do not embrace the total production of blown tumblers, as many were reported under "cut glass," having received light cutting. A large proportion of the lower grade of blown tumblers manufactured in Pennsylvania was made on the blowing machine, but practically all the finer grades were made by hand. Great improvements in the finishing of this class of ware have been made in the last few years, and much of the "cracking-off" is done by a machine on which a gas jet is used in place of a wire, one machine, operated by a boy, having a capacity of 9,000 tumblers a day. Improvements in grinding machinery have made it possible for two girls with one machine to grind 22,500 dozen tumblers in a week. For a long period blown tumblers, stemware, and bar goods have formed a large item in glass exports, being shipped to the principal countries of the world in steadily increasing quantities.

Decorated opal or porcelain glassware was very much

in favor with the public during the closing years of the last decade. It was made into small-piece sets, in an endless variety of novelties and toilet articles. In 1900 the manufacture of 3,750,443 dozen pieces was reported, representing 9.3 per cent of the total value of pressed and blown glassware manufactured. In large part the decorations were of the cheapest kind, the average price per dozen for the United States being 42 cents. Twenty-six establishments in 6 states reported its manufacture, and 90.7 per cent of the total value of the products was made in Pennsylvania and West Virginia. Establishments in Pennsylvania made 78 per cent of the total quantity and 76.8 per cent of the total value, and in West Virginia 12.8 per cent of the total quantity and 13.9 per cent of the total value. Establishments in Indiana, Ohio, Massachusetts, and New York were engaged also in manufacturing this class of ware. The great demand for decorated opal or porcelain glassware developed within the last half of the decade, and in 1900 its manufacture formed a prominent part in the operations of some of the largest pressed ware establishments in the country, leading to a large increase in the decorating facilities of those plants. The craze for opal ware was decreasing at the close of the census year and the production gave evidence of soon returning to normal proportions.

Cut glassware, 134,726 dozen pieces in number, valued at \$672,463, an average of \$4.99 a dozen, was reported by 12 establishments in 1900. This report does not cover the numerous glass-cutting establishments in which the basic material used is the glass blank and in which the manufacture consists merely in reworking the glass. A large portion of the cut glass reported from Pennsylvania and West Virginia was light-cut articles, such as tumblers, although there was 1 establishment in Pennsylvania engaged largely in the manufacture of cut ware of the highest grade. The percentages of the total quantity and total value manufactured in the several states are as follows: Pennsylvania, 42.2 per cent of the total quantity and 46.3 per cent of the total value, at an average value of \$5.48 per dozen pieces; Massachusetts, only 2.5 per cent of the total quantity but 21.8 per cent of the total value, the average value of \$44 per dozen indicating the manufacture of the richest cut ware; the same is true of Ohio, with only 2.2 per cent of the total quantity and 18.7 per cent of the total value, an average value per dozen of \$43.45. In West Virginia, with its large production of blown ware, practically all light cutting was done, the product averaging \$1.23 per dozen in value; the product of that state was 23 per cent of the total quantity, but only 13.1 per cent of the total value.

West Virginia was first in the number of pieces manufactured, although its product was practically all of the cheapest kind. A small product was also reported from Indiana. The largest part of the cut glass manufactured was made in establishments in which the glass was re-

worked only, and is not included in this report. A list of such establishments, published at the close of the census year, giving the number in each state, was as follows: New York, 21; Pennsylvania, 13; Illinois, 4; Connecticut, 2; and Massachusetts, Rhode Island, New Jersey, West Virginia, and Michigan, 1 each. The industry has had a large growth in the last decade, particularly during the latter part of it, the number of establishments having doubled and the number of frames operated more than trebled. The demand has steadily increased and the market widened as prices have been lowered by competition. The popularity of pressed ware in imitation of cut ware shows the widespread desire for the real cut article. An improvement that will probably be made in the industry is the manufacture of the blank by pressing, increasing the speed of manufacture fourfold over the blowing process. It was for a long time the practice to import the blanks from France for most of the finest grade of ware cut in this country, but the domestic blank is now conceded by competent judges to be equal, if not superior, and is steadily supplanting the imported article. The superiority of American rich cut glass is generally acknowledged at home and abroad.

The amount reported as the value of all other pressed and blown ware products, \$1,384,945, includes a large variety of articles for different purposes. One item that has come into prominence during the last few years is the manufacture of prismatic glass for increasing the diffusion of sunlight in buildings. The product of the only establishment manufacturing glass play marbles in the United States, located in Ohio, is included in this total.

The value of all products other than glass reported by establishments manufacturing pressed and blown ware and bottles and jars was \$690,562, a large item being packages, particularly for lamp chimneys. According to some manufacturers, the profit in certain lines of chimneys lies entirely in the sale of the package.

MATERIALS.

Table 10 is a comparative summary of the quantity and cost of the materials used, with percentages of increase, for 1890 and 1900.

TABLE 10.—QUANTITY AND COST OF MATERIALS USED, 1890 AND 1900, WITH PER CENT OF INCREASE.

	1900	1890	Increase.	Per cent of increase.
Total cost.....	\$16,781,009	\$12,140,985	\$4,640,024	37.8
Glass sand, tons.....	581,720	369,328	212,392	57.5
Cost.....	\$846,822	\$899,998	\$53,176	15.9
Soda ash, tons.....	157,779	96,777	61,002	63.0
Cost.....	\$2,259,939	\$3,108,233	\$848,294	127.3
Salt cake, tons.....	53,257	38,092	15,165	39.8
Cost.....	\$518,590	\$604,179	\$85,589	14.2
Nitrate of soda, ons.....	10,770	7,031	3,739	53.2
Cost.....	\$320,937	\$278,291	\$42,646	15.3

¹ Decrease.

TABLE 10.—QUANTITY AND COST OF MATERIALS USED, 1890 AND 1900, WITH PER CENT OF INCREASE—Con.

	1900	1890	Increase.	Per cent of increase.
Limestone, tons.....	91,015	45,482	45,533	100.1
Cost.....	\$181,717	\$136,450	\$45,267	33.2
Lime, hundred weights.....	794,679	743,765	50,914	6.8
Cost.....	\$147,901	\$150,092	\$2,191	1.5
Arsenic, pounds.....	2,349,261	1,828,007	520,254	28.9
Cost.....	\$112,630	\$61,575	\$51,055	82.9
Manganese, pounds.....	1,468,638	610,915	857,723	141.5
Cost.....	\$57,493	\$31,090	\$26,403	85.0
Litharge, pounds.....	8,386,106	5,501,559	2,884,547	52.4
Cost.....	\$490,200	\$300,096	\$190,104	63.3
Potash or pearl ash, pounds.....	4,406,211	2,544,373	1,861,838	73.1
Cost.....	\$186,847	\$135,047	\$51,800	38.4
Grinding sand, tons.....	205,438	227,416	21,978	10.7
Cost.....	\$166,040	\$151,955	\$14,085	9.2
Fire clay or pot clay, pounds.....	32,151,017	37,066,652	4,915,635	13.3
Cost.....	\$221,183	\$328,903	\$107,720	48.7
Pots, not including those made at works, number.....	8,941	8,006	935	11.7
Cost.....	\$381,147	\$399,875	\$18,728	18.2
Fuel, cost.....	\$3,203,146	\$2,340,912	\$862,234	36.8
Packages and packing materials, cost.....	\$4,913,544	\$1,853,462	\$3,060,082	165.1
All other materials, cost.....	\$2,722,873	\$1,366,797	\$1,356,076	99.2

¹ Decrease.

The cost of materials used in the combined industry of glass manufacture in 1900 was 37.8 per cent greater than in 1890. In nearly all the principal materials, a comparison of returns for 1900 with those for 1890 shows a large increase in the quantity used and a decided decrease in the average cost per unit, notwithstanding the fact that in 1900 the prices of practically all glass-making materials were sharply advanced. An increase of 57.5 per cent is shown in the total number of tons of glass-melting sand reported used in 1900 over 1890, 581,720 tons being reported in 1900 and 369,328 in 1890. On the other hand, a decrease of 5.9 per cent in total cost is shown in 1900 from 1890, the total cost in 1890 being \$899,998, while in 1900 the total cost was \$846,822. The average cost per ton in 1900 was \$1.46 compared with \$2.44 in 1890. Glass sand of very fine quality in practically inexhaustible supplies, is found in many parts of the country, although the chief sources of supply are still, as they have been for many years, the Juniata Valley in Pennsylvania; Hancock county, West Virginia; the Fox River district in Illinois; and St. Charles, St. Louis, and Jefferson counties in Missouri. By far the largest proportion of the glass sand used comes from these deposits, although southern New Jersey still furnishes sand for a number of factories in the East, and sand of the finest quality still comes from Berkshire, Mass. The cost of transportation and the fine quality of more available deposits have considerably restricted the output from the latter locality. During the census year a considerable quantity of good glass sand came from Westmoreland county, Pennsylvania.

The preparation of sand for the glass factories became a highly specialized business during the last decade, about a score of establishments being exclusively engaged in the industry, with elaborately equipped plants representing large investments. The active competition which developed among these establishments is

principally accountable for the large decrease in price in 1900 compared with 1890. Eight establishments in the Juniata Valley were merged under one head during the census year and prices on all grades of sand were sharply raised. Many glass manufacturers, however, had contracted for their supply for the season during the period of low prices, and, in addition, two of the largest manufacturing interests were mining and preparing their own sand to a large extent, making it cost them considerably below the average. Competition has led to the greatest care and attention in the preparation of the glass sand and the maintenance of a high quality.

The supply of soda ash for glass manufacture formerly came almost entirely from England; but during the last decade, through the development of the Solvay process, practically all soda ash used in glass making was of domestic manufacture, coming mainly from Syracuse, N. Y., and near Detroit, Mich. A large plant was projected during the census year at Barberton, Ohio, by glass manufacturing interests. One of the greatest advances in the domestic manufacture of soda ash was the establishment during the decade of large works at Wyandotte, Mich., by glass manufacturers to directly supply their wants. The number of tons of soda ash reported in 1900 was 157,779, compared with 96,777 tons in 1890, an increase of 63 per cent, while the total cost in 1900 was \$2,259,939, compared with \$3,108,233 in 1890, a decrease of 27.3 per cent. The average cost per ton in 1900 was \$14.32, compared with \$32.12 in 1890. The demand for soda ash in 1900 was unusually large, exhausting the domestic supply and greatly increasing importations. This abnormal demand came from outside the glass industry, the textile industry using a large quantity, and is shown by the large increase of importations in 1900 over 1899. As reported by the Bureau of Statistics of the Treasury Department, imports entered for consumption were 80,118,967 pounds, valued at \$665,104, in 1900, compared with 41,844,101 pounds, valued at \$304,549, in 1899.

The salt cake used in glass making twenty years ago was nearly all imported, but the greater portion of the amount consumed in the census year was of domestic manufacture, many large chemical manufacturers furnishing it, to the almost total exclusion of the foreign product. Competition has lowered the average cost per ton 38.6 per cent from 1890 to 1900, the average cost per ton for the respective years being \$15.86 and \$9.74. The number of tons used in 1890 was 38,092, costing \$604,179, compared with 53,257 tons in 1900, costing \$518,590, an increase in quantity of 39.8 per cent and a decrease in cost of 14.2 per cent.

Practically the entire supply of nitrate of soda used in glass manufacture in the United States comes from South America. The number of tons used in 1890 was 7,031, costing \$278,291, compared with 10,770 tons in

1900, costing \$320,937, an increase in quantity of 53.2 per cent and in cost of 15.3 per cent. In 1890 the average price per ton was \$39.58, compared with \$29.80 in 1900.

The number of tons of limestone used in glass manufacture in 1900 was 91,015, costing \$181,717, or an average of \$2 per ton, compared with 45,482 tons in 1890, costing \$136,450, or an average cost of \$3 per ton. The increase in the quantity used in 1900 over 1890 was 100.1 per cent, and in cost 33.2 per cent. Ohio and Indiana were the principal sources of supply.

The quantity of lime used in 1900 was 794,679 hundredweight, costing \$147,901, compared with 743,765 hundredweight in 1890, costing \$150,092, an increase in 1900 over 1890 of 6.8 per cent in quantity and 1.5 per cent in cost. The average cost per hundredweight in 1890 was 20.2 cents, and in 1900 was 18.5 cents. Much of the lime is wood-burned and ground and bolted, the industry being highly developed in Seneca county, Ohio, and vicinity.

England has been the chief source of the supply of arsenic used in glass manufacture. Recently, however, the imports from that country have been greatly reduced by the supply from the gold fields of British Columbia. At the close of the census year, movements were in progress which promised to result in the development of the manufacture in this country, and it is confidently asserted that in a few years the glass industry will be supplied entirely by arsenic of domestic manufacture. In 1890, 1,823,007 pounds were reported, costing \$61,575, and in 1900, 2,349,261 pounds, costing \$112,630, an increase of 28.9 per cent in the quantity and 82.9 per cent in the cost.

Manganese, which comes largely from Saxony, was used in 1890 in glass making to the extent of 610,915 pounds, costing \$31,080, compared with 1,493,538 pounds in 1900, costing \$57,493, an increase in quantity of 144.5 per cent and in cost of 85 per cent. The average price per pound was 5.1 cents in 1890 and 3.2 cents in 1900.

The proportion of litharge manufactured in the United States for use in glass manufacture is steadily increasing, but a large proportion is still imported from England. The quantity used in 1890 was 5,501,559 pounds, costing \$300,096, compared with 8,386,106 in 1900, costing \$490,200, an increase in quantity of 52.4 per cent and in cost of 63.3 per cent. The average cost per pound in 1890 was 5.5 cents and in 1900 was 5.8 cents.

There were 2,544,978 pounds of potash or pearl ash, which was supplied principally from Germany, used in 1890, costing \$135,047, compared with 4,406,211 pounds in 1900, costing \$186,847, an increase in quantity of 73.1 per cent and in cost of 38.4 per cent. The average cost per pound in 1890 was 5.3 cents and in 1900 was 4.2 cents.

A notable increase is shown in the consumption of

packages and packing materials in 1900 over 1890. The cost of such materials in 1890 was \$1,853,462 compared with \$4,913,544 in 1900, an increase of 165.1 per cent. The neatness of the package received special attention during the latter part of the decade, and great improve-

ment has resulted, compared with the practice followed formerly.

IMPORTS AND EXPORTS OF GLASS.

Table 11 presents the value of the different kinds of glass imported and exported from 1869 to 1900, inclusive.

TABLE 11.—VALUE OF GLASS IMPORTED AND EXPORTED: 1869 TO 1900.¹

YEAR.	IMPORTS.										EXPORTS.		
	Total value.	Bottles, vials, carboys, etc. ²	Cylinder and common window glass, unpolished.	Cylinder and crown glass, polished.		Plate glass.			Glass plates or disks for optical instruments. ⁴	All other.	Total value.	Window glass. ⁵	All other.
				Unsilvered.	Silvered. ³	Fluted, rolled, or rough.	Cast, polished, unsilvered.	Cast, polished, silvered.					
1900.....	\$5,037,931	\$464,483	\$1,555,924	\$539,082	\$286	\$7,015	\$226,295	\$12,413	\$125,449	\$2,106,084	\$1,936,119	\$36,218	\$1,899,901
1899.....	4,803,660	371,394	1,275,184	521,957	622	9,528	233,190	419	119,892	1,771,594	1,503,651	32,690	1,470,961
1898.....	3,782,617	338,861	953,116	569,380	66,768	9,880	161,637	562	107,572	1,574,841	1,211,084	28,480	1,187,604
1897.....	5,603,868	600,308	1,181,696	301,412	772,296	18,245	285,485	21,870	94,242	2,328,314	1,208,187	13,369	1,194,818
1896.....	7,528,420	382,101	1,067,999	190,704	1,158,321	23,486	773,250	34,119	92,628	3,805,812	1,062,225	14,994	1,047,231
1895.....	6,627,473	531,904	835,730	61,212	782,778	23,090	684,131	16,740	85,794	3,605,194	946,381	11,140	935,241
1894.....	5,238,697	506,188	1,067,787	23,814	786,004	38,121	449,086	75,106	71,881	2,272,215	922,072	19,311	902,761
1893.....	8,082,639	739,037	1,496,326	91,559	1,679,185	70,493	829,596	154,404	60,898	2,961,141	973,327	10,229	963,098
1892.....	8,823,952	827,761	1,674,679	153,404	1,549,968	56,162	887,626	119,201	69,988	3,485,103	942,302	10,238	932,064
1891.....	8,468,936	926,010	1,475,338	91,248	1,912,391	78,030	1,351,308	183,015	99,623	2,346,472	863,374	11,244	857,130
1890.....	7,411,343	912,704	1,461,736	74,546	1,529,401	84,715	931,823	249,819	58,830	2,108,269	882,677	8,910	873,767
1889.....	7,724,662	825,411	1,444,982	91,105	756,577	130,172	933,816	1,243,455	10,741	2,238,903	394,200	16,364	377,836
1888.....	7,867,263	815,564	1,397,898	95,147	59,208	131,224	1,258,736	1,801,514	12,538	2,295,484	381,623	10,735	370,895
1887.....	7,336,771	739,240	1,420,169	85,500	1,262	90,899	1,191,134	1,647,151	16,876	2,144,547	383,504	15,955	367,449
1886.....	6,858,085	609,435	1,360,955	27,807	.....	107,057	907,267	1,528,379	19,988	1,797,197	773,373	8,246	765,632
1885.....	6,256,194	500,160	1,630,844	18,287	189	118,693	900,461	1,192,147	.....	1,805,413	733,915	10,055	723,860
1884.....	7,552,498	521,787	2,431,068	28,095	.....	101,777	959,817	1,387,728	.....	2,121,626	339,756	18,665	321,091
1883.....	7,762,543	.....	1,736,700	62,830	.....	62,898	1,145,709	1,226,432	.....	3,528,174	998,857	.....	998,857
1882.....	6,634,371	.....	1,387,257	27,117	.....	56,407	1,183,482	943,706	.....	3,036,402	804,235	.....	804,235
1881.....	5,878,025	.....	1,414,709	57,754	.....	32,422	979,462	833,385	.....	2,560,303	756,022	.....	756,022
1880.....	5,221,511	.....	1,439,447	15,001	.....	22,799	835,496	911,144	.....	1,997,024	749,866	.....	749,866
1879.....	3,222,479	.....	955,070	11,110	.....	6,527	699,459	575,549	.....	1,334,764	768,644	.....	768,644
1878.....	3,345,149	.....	812,612	7,168	.....	5,685	885,823	672,066	.....	1,061,795	369,032	.....	369,032
1877.....	3,936,736	.....	1,006,456	8,432	.....	14,405	1,263,864	552,399	.....	1,090,680	653,061	.....	653,061
1876.....	4,806,948	.....	1,292,020	5,448	.....	29,069	1,358,881	773,423	.....	1,348,107	628,121	.....	628,121
1875.....	5,805,115	.....	1,656,040	21,166	.....	47,265	1,620,032	887,847	.....	1,572,765	691,310	.....	691,310
1874.....	6,257,964	.....	1,881,368	14,993	.....	34,237	1,655,909	961,512	.....	1,710,005	631,827	.....	631,827
1873.....	7,420,044	.....	2,759,728	21,217	.....	34,130	1,550,857	823,076	.....	2,230,936	627,562	.....	627,562
1872.....	5,834,712	.....	2,103,827	23,931	.....	17,697	1,063,810	303,487	.....	1,821,960	547,112	.....	547,112
1871.....	4,269,620	.....	1,447,292	16,733	.....	20,191	919,435	651,487	.....	1,208,477	466,447	.....	466,447
1870.....	4,157,634	.....	1,459,067	13,801	.....	24,684	820,262	615,347	.....	1,219,733	530,654	.....	530,654
1869.....	3,895,739	.....	1,466,138	25,885	.....	22,173	717,952	625,338	.....	1,038,253	530,713	.....	530,713

¹ Reports of United States Treasury, Bureau of Statistics.

² Included in "all other" glass and glassware imported previous to 1884.

³ Included in "unsilvered cylinder and crown glass, polished" previous to 1885.

⁴ Not separately reported previous to 1886.

⁵ Included in "all other" glass and glassware exported previous to 1884.

The import figures presented in Table 11 for "cylinder and crown glass, polished," and plate glass, silvered and unsilvered, show the great victory the American manufacturers of polished plate glass have gained in superseding the foreign article, particularly the foreign mirror plate, by glass of domestic manufacture. The silvered, polished crown glass is styled German looking-glass plate, while the silvered polished plate glass is what is commonly known as French mirror plate. The German plate is lighter and inferior to the French plate and is nearly all imported under 5 square feet in dimensions, while the French plate is of larger sizes. From 1869 to 1889, inclusive, the value of importations of French mirror plate was nearly equal to the imports of polished plate glass unsilvered, the aggregate value of the French mirror plate during the twenty-one years being \$20,557,075 while the value of the unsilvered polished plate was \$22,901,144. Previous to 1885 the

importations of the German mirror plate are included in the table with the unsilvered polished cylinder and crown glass, the larger part of the polished cylinder and crown imported to that date being employed for car windows and similar uses where a glass thinner than ordinary plate and of better quality than common window glass was desired. The importations of silvered German mirror plate previous to 1889 were inconsiderable, but in that year their value increased from \$59,208 in 1888 to \$756,577, or 1,177.8 per cent.

The year 1889 marked the beginning of the decline of the importations of French mirror plate and the growth of the importations of German plate. The value of imported French silvered plate in 1890 was only \$249,819, a decrease of 79.9 per cent from the previous year; this was due in part to the introduction of American plate, but more to the remarkable increase in importations of the cheaper German plate.

The value of the German silvered plate imported in the same year increased \$772,824, or 102.2 per cent over 1889. For the next seven years, German silvered plate importations exceeded in value the combined value of silvered and unsilvered polished or French plate. The plate glass manufacturers of the United States during this time were directing their competition against the more profitable field filled by the French silvered and unsilvered plate, so that the German plate had nearly a clear field. However, an increase of plate glass productive capacity in the United States in 1894 produced a period of low prices that caused large reductions in the value and number of square feet of all foreign plate imports, reducing the value of imported French mirror plate 51.4 per cent from 1893 to 1894; German silvered plate 53.2 per cent; polished plate and rough plate, each 45.4 per cent; and unsilvered polished cylinder and crown glass 75.6 per cent. From this period of low prices a better organization of the American plate glass manufacture developed, a consolidation of individual companies controlling a large percentage of the capacity being formed; and the fight against foreign glass was carried on so successfully that from 1894 French mirror imports have dwindled to insignificant proportions, being, in 1900, 83.5 per cent less than in 1894 and 95 per cent less than in 1890. During 1895 and 1896 imports of polished plate, unsilvered, increased to some extent, caused largely by the sale in the United States at low prices of surplus foreign stock. After 1896, however, the American manufacturing interests lined up more closely against the foreign trade, and since then the value of imported polished plate has been gratifyingly small, showing in 1900 a decrease of 70.4 per cent from 1896 and 79.8 per cent under the total value of 1890.

While German mirror import values received a decided check in 1894 and 1895, the next two years witnessed a revival and a change in the form of importation, an increased quantity being imported unsilvered, to be silvered by American mirror makers. Table 11 shows a marked decrease in the value of silvered German plate imports in 1897 and a considerable increase in the unsilvered imports. American competition has made it advantageous to have the silvering done in this country. With French mirror plate practically excluded, the plate-glass manufacturers of the United States took up the German mirror plate problem, and by selling superior polished plate to the mirror trade at cost, or less, reduced the value of German plate imports, unsilvered and silvered, nearly one-half in 1897, and at present have stopped the importation of the German silvered plate even more completely than they have the French product. In 1900 practically all the German plate was imported unsilvered, and was much less than the total quantity, silvered and unsilvered, annually imported from 1890 to 1897.

A portion of the imported polished cylinder and

crown glass comes in competition with domestic window glass for car windows, but the expected development of the manufacture of thin polished plate glass in this country may probably supplant the foreign article for high-quality and light-weight glazing purposes. Ninety-five and five-tenths per cent of the total quantity of unsilvered polished cylinder and crown glass imported in 1900 was shipped from Germany, the remainder being divided among Austria-Hungary, Belgium, France, Netherlands, and the United Kingdom. Of the total quantity of fluted, rolled, and rough plate imported in 1900, the United Kingdom supplied 91.3 per cent and France, Belgium, and Germany, the remainder. The importation of polished plate glass is controlled by an European syndicate, and is apportioned among the various producing countries; Belgium furnishing, in 1900, 80.2 per cent of the total quantity; Germany, 8.1 per cent; and the United Kingdom and France, practically all the remainder. The extent of the importation is determined largely by trade conditions abroad, this market being used for the disposal of surplus products, with slight regard to price. New York is the principal port of entry for plate glass.

The value of importations of fluted, rolled, and rough plate has steadily decreased, being, in 1900, 90.7 per cent less than in 1890. The total value of such imports in 1900 was nearly equaled by the direct export shipments of one American skylight factory.

Window glass importation values have maintained comparative regularity during the last thirty years. The total value of window glass imported during the decade ending with 1880 was \$14,993,860; from 1880 to 1890, \$15,686,308; and from 1890 to 1900 the value was \$12,583,779. While the total value of window glass imported during the last decade was less than that of each of the two preceding decades, the value in 1900 exceeded that in 1890 by 6.4 per cent; 1880 by 8.1 per cent; and 1870, by 6.6 per cent. The number of pounds imported in 1900, as reported by the United States Treasury Bureau of Statistics, was 51,343,339, which, estimating 70 pounds to the 50-foot box, 25 per cent double strength, equals 733,476 boxes, or 16.9 per cent of the quantity manufactured in the United States in that year. The number of pounds imported during each of the preceding ten years was as follows: 1899, 47,202,267; 1898, 38,908,992; 1897, 55,961,813; 1896, 53,182,301; 1895, 40,786,279; 1894, 52,437,068; 1893, 63,715,989; 1892, 72,682,127; 1891, 58,932,738; 1890, 73,112,550. The imports, 92.7 per cent of which come from Belgium and the remainder from the United Kingdom, Germany, and France, are regulated largely, as in plate glass, by the condition of the foreign market. The Continental and far Eastern markets are the most profitable fields for Belgian window glass, and if the demand in these markets is weak and a surplus stock accumulates in Belgium, increased shipments to the United States follow. Belgian glass, the product of

cheaper labor, constantly acts as a check on window-glass prices in the United States, for unless the demand abroad is unusually strong, the first announcement of high prices in this country results in an increase of exports. The foreign window glass, as in the case of plate glass, was for a long time credited with superior quality, especially as to finish, but in both cases that claim has been disproven in the progress of the American plate and window glass manufacture during the last decade. In 1900 Boston, Mass., was the principal entry port for foreign window glass, followed by New York, N. Y. The entry ports for the South are St. Louis, Mo.; Baltimore, Md.; Newport News, Va.; and New Orleans, La. Previous to 1901 most of the window glass used on the Pacific coast was of foreign manufacture, entering principally at San Francisco. The cheapness of ballast freight rates of wheat-carrying ships returning to the Pacific coast, compared with the expensive overland freight rates from the domestic window-glass factories, gave the foreign glass a great advantage, but American manufacturers, by a decided differential in price and systematic distributing arrangements, have succeeded lately in steadily reducing the importations to that section of the country.

The value of imports of bottles, vials, carboys, etc., has shown an almost constant decrease from year to year during the last ten years. The total value in 1900 was \$464,483, or 49.1 per cent less than in 1890. About one-half of the total importation consists of bottles filled with liquors, mineral waters, etc., and the principal exporting countries are Germany, France, Austria-Hungary, and the United Kingdom, in the order named. The importation of empty bottles, therefore, is very small in comparison with the domestic output. New York and Baltimore are the chief entry ports, but many unfilled bottles enter at San Francisco, coming over at cheap rates in returning wheat-carrying ships. Boston, New Orleans, and Philadelphia, also have large receipts.

The importation of optical glass has steadily increased, the development of the photographic camera being a strong stimulant. A large portion of the total importation enters in the New York camera district at Rochester, N. Y. Germany furnished 43.7 per cent of the total value in 1900; the United Kingdom, 33.7 per cent; and France, 22.6 per cent. Attempts have been made in this country to make optical glass, but the manufacture has never passed beyond the experimental stage, and at present even experimenting has ceased. The time and care required and the uncertainty as to results attending every melt, in face of the free entry of these products from countries long skilled in the art, make the manufacture of optical glass an unattractive proposition to glass manufacturers in the United States.

A large proportion of the \$2,106,084 reported as the value of "all other" glass imports in 1900, was that of fancy decorated Bohemian glassware, much of it made to sell at low prices. The fancy colored and decorated

ware, of the Bohemian order, is as yet but a small item in glass manufacture in the United States, although a large quantity is purchased. Increased attention is being given to it, and such success was achieved in its manufacture during the census year by at least one firm, that it will very likely have a vigorous growth during the next few years. Decorated opal or porcelain glass has met with great favor in this country for several years, and in addition to the large quantity of home manufacture, a considerable quantity has been imported, mostly from Germany. Germany has a large trade in chemical glassware for laboratory use, and, with England and France, is finding a rich and almost undisputed field here for that class of ware. The manufacture of chemical ware has been carried on in the United States in a small way, but a recent movement among American chemists in favor of home manufacture has caused more or less agitation among glass manufacturers, and gives promise of leading to a determined attempt on the part of one or two firms, to establish the industry on a larger scale in this country.

Great progress has been made in recent years in the manufacture of expensive "art glass" of the highest order. One of the exhibits which attracted considerable attention from glass men of all countries at the Paris Exposition was a new art glass manufactured by a firm in New York city. High-grade lamps, unsurpassed by any manufactured, have been produced in this country. Watch crystals, which are not manufactured in the United States, although it was attempted recently in West Virginia, are imported in large numbers of small aggregate value. The process of manufacture is simple, and it will in time probably form a part of the American industry. A thin round ball or bubble of glass is blown, and from this, with diamond-pointed compasses, the circular disks are cut, which are then placed on properly shaped blocks and bent to the required shape by reheating. Of the total value of "all other" glass imports, 33 per cent comes from Germany, 28.1 per cent from Austria-Hungary, 23.1 per cent from France, 7.8 per cent from the United Kingdom, and 6.3 per cent from Belgium.

Table 11 presents, in addition to the value of imported glass, the value of glass of domestic manufacture exported annually, from 1869 to 1900, inclusive.

The exportation of all other than window glass has almost constantly increased from year to year since 1869, gaining 227.2 per cent in value during that period, and 117.4 per cent during the last decade. The gain in the ten years ending with 1890 over the ten preceding years was \$1,830,612, and between 1890 and 1900 over the ten preceding years, \$2,922,065. American glassware is exported to nearly every civilized country, 68 countries being reported by the Bureau of Statistics of the Treasury Department in 1900. Canada received 30 per cent of the total value in 1900; Mexico, 14.6 per cent; Australia, 12.8 per cent; Cuba, 8.2 per cent;

and the United Kingdom, 7.3 per cent. An inquiry as to exports was incorporated in the schedule used for the purpose of eliciting complete information as to the articles exported and their destinations; but as the largest part of the exporting is done through regular exporting houses, a very small portion goes direct from the factory with its destination known. The returns from factories, therefore, are very meager, but as far as they go, furnish an idea of the comprehensive scope of the glass export business. Beer and soda bottles, and plain and lettered prescription bottles, pressed tableware, lamp chimneys, and lantern globes constitute the bulk of the exports reported direct from factories. Bottles to the value of \$161,300 were reported as exported during the census year by 12 firms, \$66,333 of which was the value of beer and soda-water bottles exported to Mexico, where a fair trade has been developed recently in that line of ware. Plain and lettered prescription bottles are a large item in the exports, and 6 firms reported direct shipments to Canada, South and Central America, Mexico, West Indies, Great Britain, France, East Indies, Australia, China, and Japan. The bottle trade with the Philippines and Cuba is very large, principally in the form of bottles filled with beer and liquor. Direct tableware exports were reported by 16 establishments, amounting to \$137,982.

American pressed tableware is unexcelled in the markets of the world for color, workmanship, and finish, which make it the closest imitation of real cut ware, at such prices as, quality considered, place it in a class by itself. Export trade is receiving special consideration from some of the largest manufacturers of pressed ware, and the American sample room and traveling agent for pressed glassware are becoming more general abroad. The largest part of the lamp chimney exportation is done by jobbing houses, yet 4 factories reported direct shipments valued at \$111,560. About four-fifths of the quantity reported went to South America, where lamp chimneys made in the United States are in high favor. As a result of a recent systematic introduction of the American lamp chimney in England and some of the continental countries, the exports in that direction are steadily increasing and have already reached a very satisfactory figure. American lantern globes are largely used in Central and South America. Canada, South America, and Australia are steadily increasing their consumption of American gas and electric glassware, such as globes and shades. Cathedral or opalescent glass valued at \$13,432 was reported as shipped direct from factory to Canada, Germany, England, and France, where, by reason of its superior colors and texture, it is preferred in the construction of art windows.

Exports of window glass show some increase during the last few years, but the lower cost of production in Belgium will, no doubt, continue to restrict, as in the

past, the foreign trade of the United States in this commodity. The exports are confined largely to Mexico, British America, and the West Indies. A plan has been discussed to operate the American window factories an extra time during the year at reduced wages to manufacture glass for export exclusively, but it has not met with favor from the workmen and from some of the manufacturers.

FURNACE IMPROVEMENT.

The greatest advance made in the American glass industry in the past decade has been in the improvement of the melting furnace in the direction of greater economy and rapidity in operation. The great feature of this development has been the widespread substitution of the tank for the pot furnace, 48.8 per cent of the total melting capacity of active plants reported during the census year being contained in tank furnaces. In the United States the tank is practically a creation of the last ten years, its standing prior to that time being experimental, though it had been used successfully abroad for a much longer period. So far Germany and Belgium have set the pace for American glass furnace construction.

The glass-melting furnace is a modification of the reverberatory furnace, the materials to be melted being exposed to the action of the flame, but not to the contact of the burning fuel. While numerous modifications exist, the furnaces generally used are of two styles, the pot furnace and the tank furnace. The former is adapted either for the use of open pots or for covered pots, and the latter is either a day tank, intermittent in its melting action, or a continuous tank in which the melting is continuous. The pot furnace contains a number of melting pots, large clay crucibles, each holding, on an average, a ton of molten glass. These pots are arranged immediately inside the breast wall of the furnace with room in the center of the furnace for combustion space. The batch, or mixture of the raw materials, is filled into these pots through an opening in the side of the furnace opposite each pot, and after the melting process is completed, the glass is gathered from the pots through these openings. The pot furnace used in the manufacture of plate glass is an exception in this respect, as the pots are removed bodily from the furnace by a crane and their contents poured on the casting table. In the tank furnace, pots are entirely dispensed with, the glass being melted and held on the hearth of the furnace itself, the flame sweeping across its surface. In the continuous tank there is a supply of molten glass at all times, the batch being filled in at one end and the glass worked out continuously at the other end. The day tank requires a night or day to melt the glass, when it is worked out and the tank again filled with the batch, the operation being similar to the working of a pot furnace. The pot furnaces used in the manufacture of window glass,

plate glass, and bottles and jars are either square or oblong in form, and those for flint glass, tableware, etc., are round or oval.

The open-pot furnace for window glass and bottles and jars varies in length according to the number of pots used, its width being about three times the diameter of the pot. The pots vary in number from 4 to 12, generally being 6 or 10, placed in the furnace in 2 rows. Openings at the ends of the furnace permit the removal and replacement of broken pots. The crown of the furnace, forming the top of the combustion chamber, is preferably rather flat, but set high enough to allow adequate flame development and good distribution of the heat between and above the pots. In the direct-fired furnace, the fuel is on a grate set in the space between the 2 rows of pots, somewhat below the level of the bench on which the pots are placed. An arched passage—the cave—runs beneath the furnace for the admission of air to the grate, and there are frequently 2 caves crossing at right angles, so as to admit air from all directions. Neither flues nor regenerators are used when the fuel is fired direct, the draft being regulated by the height of the stack of the furnace, which varies with different fuels employed. In the regenerative gas-fired furnace, the regenerators are so placed that in the event of a pot breaking, the molten glass can not reach them and obstruct the draft. The hot escaping gases from combustion pass from the combustion chamber through the checkerwork of bricks, which take up their heat and soon become very hot. The direction of the flame is reversed and the air for combustion enters through the hot regenerator, while the waste gases pass out through another regenerator. By a reversal of the direction of the flame every twenty or thirty minutes, the hot outgoing waste gases are constantly giving off their heat to the regenerators and the incoming air is constantly returning it to the furnace. In what is styled a recuperative gas-fired furnace, no reversal of the current occurs. The waste gases pass out through a series of thin-walled flues, while the incoming air is admitted through a second series of thin-walled flues, and coming in contact with the first series of flues, absorbs the waste heat. In the gas-fired furnace the air and gas flues rise vertically at either end and terminate in ports at or below the hearth level. The flame traverses the furnace from one end to the other, describing the arc of a circle, or by lessening the draft, it can be made to completely fill the furnace. The open-pot furnace for plate glass is longer than that for window or bottle glass, as it usually holds 20 large pots. There is an opening in the wall of the furnace opposite each pot to allow its removal, bodily, for casting purposes. All plate-glass furnaces are gas fired, the air and gas flues ascending and terminating vertically or coming up vertically and turning so as to enter the furnace horizontally. With the use of the lehr in plate-glass manufacture, the ten-

dency is now toward smaller pots, which increases the number that may be placed in the furnace.

The covered pot furnace for flint glass is generally circular in form. The pots have a hood-like top, which projects to the opening in the breast wall of the furnace and through which the batch is filled in and the glass worked out. This hooded top entirely shields the contents of the pot from the flame. When old or broken pots are to be replaced, the wall of the furnace is removed enough to allow for the passage of the pot. The average life of the covered pot is several months, while that of the open pot is about six weeks; the length of time, however, in each case, may be more or less. It is possible to melt a much better quality of glass in the covered pot than in the open pot, as the hooded top excludes many impurities caused by combustion. The number of covered pots in a furnace is from 8 to 16. In firing the open-pot furnace the aim is to develop in the combustion space between the pots and above them a solid flame, but with the covered pots, the flame must be divided so as to play close around each pot. To this end the flame is drawn from the center of the furnace to a series of flues at the breast wall, a flue being placed between each pot and the adjoining pot. The crown of the furnace comes just above the pots and the stack widens at the base sufficiently to take in the entire diameter of the furnace. The draft flues empty into the stack through the breast wall or through the crown. These furnaces are adapted for recuperative gas firing or direct coal firing. In the oval covered pot furnace the stack is at one side, as with the regenerative tank; greater economy of space in setting the pots is secured as well as better heating results. One method of treatment of the waste heat in a furnace of this kind is to convey it by a series of flues so as to heat the water system that heats the entire factory plant.

The first successful gas-fired glass-melting pot furnace was developed abroad in 1861, the solid fuel being converted into gas in a producer outside of the furnace. Several years were required to introduce this improvement into glass manufacture in this country. This application of gas is one of the chief improvements in modern glass making, making possible a saving in the cost of fuel of fully 50 per cent over the cost with the direct-fired furnace, greatly reducing the time of melt, improving the quality of the glass, and lengthening the life of the pot. However, the disadvantages attending the pot system of melting created a demand for a system to melt and blow the glass continuously; these disadvantages were the time lost with the pot system (fully one-half the time being spent in cooling and settling the metal, working out the glass, and reheating the furnace), and the constant loss incurred by breaking pots, one broken pot so disturbing the rest of the furnace that the full capacity is frequently unavailable for a considerable time. This led to the development of the tank furnace, which was used in Europe in 1861 and improved

in 1872. However, the general introduction of the tank into glass manufacture in the United States did not occur until 1888, the successful operation of the continuous tank for window glass at Jeannette, Pa., in that year probably marking its actual introduction into the glass industry of this country. The chief advantages of the tank over the pot furnace are increased production, economy in operation, durability of furnace, regularity of working, and intensity of heat.

The day or intermittent tank is practically a pot furnace with one large open pot comprising the entire hearth, which is a square or oblong box built up of fire clay blocks and well ventilated on the bottom to prevent excessive wear and leakage occurring when the glass gets too hot or soft on the bottom. The air and gas are brought up through flues at one end and the products of combustion are discharged through flues at the other end. Either the regenerative or recuperative system can be used. There were 130 day tanks reported in operation during the census year, 117 of which were in establishments manufacturing bottles and jars and flint ware of all varieties, the average capacity of the tank in such establishments being 6 tons, equal to 6 pots; and 13 in establishments manufacturing skylight glass, glass tiling, rolled glass, and window glass. The greatest obstacle to the successful use of the day tank on flint glass has been the maintenance of color caused by the glass melting principally from the top, leaving the glass at the bottom of the tank less fluid and more refractory, but during the past decade this tank has been so improved that, at present, a very fair grade of so-called flint glass is in many cases being produced, at a great saving in cost over the pot-melting method. With these small tanks the use of gas for fuel probably produces the best results, but oil is being introduced for this purpose with a marked degree of success.¹

The glass melting capacity of continuous tanks reported active in 1900 was 42.4 per cent of the total for the United States; pot furnaces with a total capacity of 4,300 pots were reported, day tanks of a capacity equivalent to 818 pots, and continuous tanks of a capacity equivalent to 3,775 pots, 2,476 of which were operated on bottles and jars and pressed and blown ware, and 1,299 on building glass. The continuous tank is confined largely to the manufacture of bottles and jars and window glass, 2 shifts being worked in the bottle trade and 3 in the window. The continuous regenerative melting tank contains an immense quantity of molten glass and is always full or nearly so. The window tank is oblong, four or five times as long as the width, with a capacity varying from 6 to 20 rings, each ring being equivalent to a capacity of 3 pots. The bottle tank is much shorter and wider than the window tank, and has an average of about 10 rings,

each ring being equivalent to a capacity of 2 pots. The average window tank has 8 rings, or a capacity of 24 blowers or pots. Inside it is 14 feet wide, 70 feet long, and 5 feet deep, and will contain about 425 tons of molten metal. The batch is filled in continuously at one end and drawn, melting as it goes, to the working holes at the other end, where it is worked out. Near the working end of the tank is a floating bridge of prepared clay, extending down about one-fourth of the depth of the tank, which breaks the surface of the mass of glass and acts as a purifier, the completely melted glass passing beneath the floater into the working end of the tank, while the impure glass, which rises to the top, is held in check until properly melted. The wall of the working end of the tank is pierced by working holes through which the glass is gathered, in front of each hole being a deep clay ring stationed in the glass, the refined metal coming into this ring through the bottom and being gathered from the ring by the workman. The bottom and sides of the tank are well ventilated, to lessen the strain on the structure. The regenerators are at either side of the tank foundations, and the flues lead to ports in the side walls or to ports that open through the crown, the flame entering the furnace above the surface of the glass and just beneath the crown. All arrangements are made with a view to developing a nearly continuous sheet of flame.

A modification of the continuous tank for window glass, styled the blow-over tank, was introduced into this country in 1900, though in use abroad for a number of years. There were three or four such plants erected. By the use of the blow-over tank the blow furnace for "warming in" the roller of glass during the blowing operation is dispensed with, as the roller is "warmed in" directly over the mass of molten glass in the tank, the heat of the tank accomplishing this purpose, which effects a saving in fuel of about 50 per cent, for as much fuel is often required for the blow furnaces as for the melting tank. This improvement is made by lengthening the working end of the tank to permit a series of warming-in holes on each side between the floaters and the gathering holes. The results so far obtained with the blow-over tank will probably lead to its general introduction, as, in addition to the great saving in fuel cost, the heat is much more constant and uniform than with the blow furnace.

The use of oil as a fuel for glass melting has greatly increased during the last ten years. One of the most successful methods of oil firing is the use of the cheap, heavy oil of 34 to 40 specific gravity, practically a refinery by-product, with an air pressure of from 2 to 7 ounces per square inch. The air meets the flow of oil at the end of the burner and completely atomizes it in a spray, furnishing just enough oxygen to perfect combustion. Oil is advantageous as a clean fuel of high calorific value and perfect safety, but the cost restricts its general use. Benzine is largely used in certain

¹ Elements of Glass and Glass Making, Biser, 1900, page 62.

branches of the glass industry as fuel, being especially well adapted for fuel for glory holes, particularly in the manufacture of bottles, producing an intense uniform heat and requiring but little attention.

DETAILED STATISTICS OF GLASS MANUFACTURE.

The detailed statistics for the industry as reported are shown in Tables 12, 13, and 14; Table 12 presenting statistics of the entire industry; Table 13, of the manufacture of building glass; and Table 14, of the manufacture of pressed and blown glass, and bottles and jars. These tables present separate totals for each state in which there were 3 or more establishments, and group the statistics for other states, so as not to disclose the operations of individual establishments. The establishments are classified according to the character of the ownership, which shows that in the building glass branch of the industry, 6 were owned by individuals, 11 by part-

nerships, 102 by corporations, and 5 were of a miscellaneous character; and in the manufacture of pressed and blown glass, and bottles and jars, 23 were owned by individuals, 49 by partnerships, 157 by corporations, and 2 were of a miscellaneous character. The employees are classified so as to show for salaried officials, clerks, etc., and for wage-earners separately the number and salaries or wages of men, women, and children, respectively, and also the average number of wage-earners employed during each month of the year. Separate totals are shown for the different materials, presenting the quantity and cost of each; and the quantity and value of the several products manufactured, and the value of all other products, are given. The number of engines, water wheels, electric motors, and other forms of power in use, with their horsepower, are shown. The establishments are grouped in the tables according to the number of employees in each.

TABLE 12.—GLASS MANUFACTURE, BY STATES: 1900.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	Missouri.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states. ¹
Number of establishments	355	6	110	7	5	3	26	27	28	119	16	8
Character of organization:												
Individual	29		7	1			4	3	3	10	1	
Firm and limited partnership	60	1	5	2	1		4	6	4	31	3	3
Incorporated company	259	5	98	4	4	3	18	17	21	77	12	5
Miscellaneous	7		3					1		1		
Capital:												
Total	\$61,423,903	\$2,181,801	\$12,775,369	\$581,086	\$258,949	\$2,198,316	\$5,897,662	\$2,242,634	\$5,451,513	\$28,287,187	\$1,388,084	\$711,082
Land	\$1,771,476	\$66,657	\$626,035	\$49,618	\$33,009	\$251,081	\$330,136	\$242,675	\$440,375	\$2,589,897	\$75,142	\$66,800
Buildings	\$16,954,293	\$524,764	\$4,132,323	\$144,576	\$50,047	\$668,346	\$1,104,071	\$397,004	\$1,310,359	\$6,021,796	\$397,301	\$143,200
Machinery, tools, and implements	\$14,247,283	\$118,289	\$2,936,890	\$65,559	\$85,150	\$378,589	\$353,600	\$300,232	\$1,491,631	\$7,688,311	\$234,532	\$143,500
Cash and sundries	\$25,450,851	\$1,472,091	\$5,080,075	\$320,333	\$140,752	\$400,300	\$3,549,855	\$1,302,928	\$2,208,648	\$9,992,133	\$631,109	\$352,582
Proprietors and firm members	170	1	24	4	2		17	17	9	81	6	8
Salaried officials, clerks, etc.:												
Total number	2,288	75	509	31	39	26	117	119	199	842	85	28
Total salaries	\$2,792,376	\$110,100	\$649,227	\$38,976	\$28,060	\$47,448	\$284,900	\$139,098	\$249,029	\$1,110,383	\$97,551	\$30,044
Officers of corporations—												
Number	889	12	119	6	8	4	51	29	30	107	19	4
Salaries	\$936,835	\$36,260	\$271,147	\$9,710	\$9,869	\$17,400	\$83,540	\$50,054	\$68,639	\$345,816	\$31,100	\$7,300
General superintendents, managers, clerks, etc.—												
Total number	1,879	68	390	25	31	22	266	88	169	735	66	24
Total salaries	\$1,855,541	\$73,840	\$378,080	\$29,266	\$18,191	\$30,048	\$201,420	\$83,644	\$180,890	\$764,567	\$66,451	\$29,644
Men												
Number	1,647	59	342	23	22	19	234	81	139	651	53	24
Salaries	\$1,745,140	\$71,320	\$353,093	\$27,944	\$15,326	\$28,588	\$188,740	\$80,082	\$167,888	\$722,108	\$60,457	\$29,644
Women												
Number	232	4	48	2	9	3	32	7	30	84	13	
Salaries	\$110,401	\$2,520	\$24,937	\$1,322	\$2,365	\$1,510	\$12,680	\$3,562	\$12,502	\$42,459	\$5,994	
Wage-earners, including pieceworkers and total wages:												
Greatest number employed at any one time during the year	71,713	3,904	18,523	990	534	1,051	7,421	3,499	6,233	26,048	2,375	1,140
Least number employed at any one time during the year	53,660	3,654	14,669	751	373	720	4,637	2,373	4,307	19,154	2,000	1,022
Average number	62,818	3,304	13,015	742	387	650	5,383	2,556	4,546	19,420	1,949	866
Total wages	\$27,084,710	\$1,621,286	\$7,226,047	\$339,513	\$189,074	\$341,375	\$2,462,745	\$1,305,264	\$2,067,334	\$10,287,491	\$789,422	\$455,504
Men, 16 years and over—												
Average number	42,173	2,607	10,910	562	343	648	4,366	2,201	3,505	15,136	1,819	576
Wages	\$24,901,233	\$1,496,891	\$6,808,042	\$313,920	\$179,236	\$340,825	\$2,278,806	\$1,239,971	\$1,844,958	\$9,338,261	\$657,984	\$402,839
Women, 16 years and over—												
Average number	3,529	148	634	54	19		170	73	405	1,546	468	12
Wages	\$840,001	\$28,456	\$129,808	\$8,673	\$4,392		\$82,726	\$17,831	\$96,017	\$414,250	\$103,748	\$4,100
Children, under 16 years—												
Average number	7,116	459	1,471	126	35	2	847	282	636	2,738	162	278
Wages	\$1,343,476	\$95,939	\$283,197	\$16,925	\$5,046	\$550	\$151,713	\$47,462	\$126,409	\$534,930	\$27,690	\$48,565
Average number of wage-earners, including pieceworkers, employed during each month:												
Men, 16 years and over—												
January	51,282	3,023	18,956	636	390	526	5,344	2,438	4,132	18,680	1,407	700
February	51,730	3,020	14,140	648	368	518	5,384	2,393	4,169	18,928	1,462	700
March	62,146	3,015	13,847	699	330	518	5,410	2,607	4,488	19,033	1,467	734
April	62,044	2,995	14,017	713	303	716	4,848	2,720	4,627	19,023	1,462	720
May	50,862	2,954	13,728	710	323	989	5,014	2,671	4,290	17,972	1,414	617
June	45,847	2,806	12,637	608	310	964	4,641	2,348	3,244	16,483	1,150	546
July	17,829	662	3,921	193	222	649	1,419	968	1,209	7,874	507	205
August	20,468	605	4,133	225	239	693	969	1,033	1,632	9,410	1,214	205
September	35,245	3,040	3,165	451	344	538	3,931	1,841	3,262	11,773	1,377	493
October	40,873	3,035	10,306	573	373	558	4,755	2,244	3,531	13,502	1,431	560
November	43,042	3,051	10,831	564	449	555	5,316	2,501	3,541	14,042	1,448	714
December	44,903	3,018	11,112	634	465	578	5,352	2,593	4,032	14,914	1,487	718

¹ Includes establishments distributed as follows: California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1.

TABLE 12.—GLASS MANUFACTURE, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	Missouri.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states. ¹
Average number of wage-earners, including piece-workers, employed during each month—Continued.												
Women, 16 years and over—												
January	8,820	179	792	53	15	.....	158	71	431	1,665	448	13
February	8,879	177	758	58	19	.....	159	67	439	1,731	458	13
March	8,984	177	810	62	19	.....	166	83	487	1,704	463	13
April	8,890	177	806	67	20	.....	160	90	479	1,625	463	13
May	8,486	167	625	58	20	.....	181	93	427	1,469	488	13
June	8,348	182	628	54	18	.....	182	84	402	1,384	428	16
July	1,850	24	197	25	8	.....	147	44	193	1,020	176	16
August	2,530	24	253	50	14	.....	93	60	251	1,262	508	15
September	3,428	172	442	59	21	.....	135	56	414	1,572	557	.....
October	3,907	171	715	61	20	.....	175	67	447	1,694	557	.....
November	4,135	177	801	61	24	.....	261	80	451	1,699	565	16
December	4,096	177	782	56	24	.....	223	79	445	1,733	561	16
Children, under 16 years—												
January	8,301	667	1,818	132	34	.....	996	300	829	3,040	160	380
February	8,463	659	1,878	136	35	.....	993	286	840	3,139	167	390
March	8,537	659	1,884	138	24	.....	983	300	832	3,142	176	349
April	8,644	661	1,911	197	24	.....	965	334	819	3,210	176	347
May	7,341	646	1,366	186	25	6	986	350	549	2,749	171	367
June	7,082	646	1,196	199	25	6	963	333	585	2,663	169	297
July	2,397	.....	524	5	6	8	169	116	82	1,325	77	85
August	3,350	.....	694	5	6	6	157	141	246	1,871	139	85
September	6,146	650	1,101	60	24	.....	789	239	464	2,393	182	244
October	8,091	660	1,748	137	30	.....	969	292	789	3,042	180	244
November	8,496	671	1,802	123	32	.....	1,124	329	797	3,107	177	329
December	8,544	667	1,800	136	35	.....	1,071	366	796	3,169	173	331
Miscellaneous expenses—												
Total	\$8,588,641	\$210,588	\$690,165	\$26,065	\$14,243	\$98,119	\$241,655	\$145,505	\$155,512	\$1,867,879	\$112,791	\$26,119
Rent of works	\$29,195	.....	\$780	.....	\$500	\$154	\$683	\$8,945	\$68	\$12,465	\$400	\$5,200
Taxes, not including internal revenue	\$236,338	\$9,556	\$59,550	\$2,040	\$8,155	\$6,242	\$21,663	\$8,122	\$17,260	\$100,838	\$4,804	\$8,108
Rent of offices, insurance, interest, and all sundry expenses not hitherto included	\$8,264,149	\$201,082	\$625,835	\$24,025	\$10,588	\$91,723	\$212,900	\$115,369	\$138,184	\$1,723,445	\$105,637	\$15,411
Contract work	\$58,959	.....	\$4,000	.....	.....	.....	\$6,409	\$13,069	.....	\$31,131	\$1,950	\$2,400
Materials used:												
Aggregate cost	\$16,781,009	\$674,008	\$4,582,141	\$151,500	\$137,185	\$231,515	\$1,488,700	\$899,590	\$1,253,164	\$6,485,463	\$593,251	\$284,492
Glass sand, tons	581,720	32,978	179,967	3,493	1,622	10,366	81,260	22,820	37,707	191,859	10,025	10,223
Cost	\$846,822	\$33,381	\$241,075	\$6,166	\$6,355	\$8,613	\$78,521	\$46,117	\$67,035	\$329,465	\$14,203	\$15,891
Soda ash (carbonate of soda), tons	157,779	12,017	48,629	1,601	194	3,048	20,630	7,508	11,072	46,898	2,847	3,835
Cost	\$2,259,939	\$164,827	\$686,471	\$23,276	\$6,342	\$47,554	\$310,641	\$118,586	\$156,797	\$689,152	\$43,724	\$68,569
Salt cake (sulphate of soda), tons	58,257	.....	14,371	.....	125	226	697	1,453	1,751	34,297	337	.....
Cost	\$518,590	.....	\$133,232	.....	\$1,625	\$2,311	\$7,478	\$13,605	\$18,428	\$287,311	\$4,600	.....
Nitrate of soda, tons	10,770	440	2,329	149	24	.....	1,314	548	1,259	4,330	307	70
Cost	\$920,937	\$13,720	\$75,243	\$5,000	\$830	.....	\$21,165	\$19,174	\$39,634	\$132,389	\$10,082	\$2,800
Limestone, tons	91,015	4,815	27,993	185	100	4,112	8,577	2,462	3,356	38,309	450	656
Cost	\$181,717	\$9,912	\$47,882	\$578	\$225	\$8,566	\$25,471	\$6,826	\$6,536	\$71,110	\$325	\$3,780
Lime, hundredweight	794,679	45,887	230,148	15,123	559	610	198,923	32,819	75,633	147,975	15,728	31,764
Cost	\$147,901	\$10,175	\$37,501	\$11,492	\$112	\$140	\$26,873	\$8,885	\$14,712	\$37,046	\$10,540	\$5,910
Arsenic, pounds	2,349,261	45,607	837,487	4,621	7,789	24,233	102,490	101,570	228,587	\$96,074	80,503	20,360
Cost	\$112,680	\$2,173	\$40,848	\$207	\$370	\$1,217	\$4,942	\$4,942	\$11,751	\$41,295	\$3,837	\$1,078
Carbon, tons	4,155	90	1,883	.....	15	18	20	51	133	1,925	13	6
Cost	\$17,000	\$1,018	\$6,557	\$100	\$540	.....	\$405	\$544	\$600	\$6,950	\$155	\$70
Manganese, pounds	1,498,588	59,888	521,980	11,167	8,101	33,000	143,465	90,721	76,117	467,581	58,944	\$2,240
Cost	\$57,493	\$1,960	\$19,655	\$566	\$207	\$825	\$5,674	\$3,800	\$5,672	\$17,474	\$2,239	\$1,421
Litharge (red lead), pounds	8,386,106	115,600	1,482,887	36,982	364,443	.....	72,049	822,130	2,063,000	3,143,727	285,288	.....
Cost	\$490,200	\$6,242	\$76,215	\$1,857	\$24,497	.....	\$3,918	\$48,137	\$117,035	\$91,716	\$20,583	.....
Potash or pearlash, pounds	4,406,211	.....	463,481	75,000	207,967	.....	60,270	469,186	850,171	1,938,334	351,802	.....
Cost	\$186,847	.....	\$18,564	\$3,000	\$8,994	.....	\$2,866	\$20,593	\$34,129	\$82,234	\$16,557	.....
Grinding sand, tons	295,488	.....	71,162	.....	.....	4,743	433	50	6,897	182,117	46	.....
Cost	\$166,040	.....	\$37,533	.....	.....	\$1,897	\$519	\$120	\$2,520	\$123,186	\$265	.....
Rouge, pounds	837,536	.....	267,845	.....	.....	20,980	1,300	.....	14,987	532,524	400	.....
Cost	\$24,747	.....	\$9,061	.....	.....	\$693	\$41	.....	\$897	\$18,971	\$84	.....
Plaster of paris, tons	23,066	.....	7,600	.....	.....	596	.....	10	611	14,184	4	1
Cost	\$108,531	.....	\$35,104	.....	.....	\$3,790	.....	\$71	\$1,811	\$68,171	\$57	\$18
Fire clay, or pot clay, pounds	\$2,151,017	642,000	8,624,298	245,900	66,158	426,520	2,108,845	1,033,200	2,549,910	15,926,246	154,940	373,000
Cost	\$221,183	\$5,687	\$64,394	\$1,390	\$720	\$2,795	\$13,875	\$8,378	\$7,055	\$113,822	\$1,587	\$1,485
Pots, not including those made at works, number	8,941	309	2,429	164	116	58	366	475	1,199	3,461	350	20
Cost	\$381,147	\$17,680	\$101,884	\$7,286	\$8,175	\$2,030	\$12,517	\$17,520	\$61,971	\$135,765	\$17,999	\$1,320
Flattening stones, number	272	.....	79	.....	4	.....	14	.....	24	146	4	.....
Cost	\$16,344	.....	\$5,100	.....	\$200	.....	\$315	\$60	\$1,550	\$9,049	\$160	.....
Fuel—												
Total cost	\$3,203,146	\$155,400	\$355,300	\$47,980	\$33,047	\$75,689	\$445,828	\$227,158	\$249,405	\$1,421,710	\$88,905	\$102,724
Natural gas	\$1,575,278	.....	\$361,553	.....	.....	.....	.....	\$9,190	\$110,616	\$1,016,903	\$87,016	.....
Oil, gallons	12,690,856	1,603,301	624	293,107	371,867	50,000	5,098,181	1,347,692	1,250,750	1,116,129	18,650	1,480,555
Cost	\$409,158	\$41,084	\$115	\$10,051	\$16,619	\$2,000	\$159,327	\$48,345	\$31,899	\$50,227	\$585	\$40,906
Coal, tons	755,463	114,675	952	17,395	4,136	45,293	104,926	68,959	77,409	300,484	1,271	19,063
Cost	\$1,074,074	\$35,312	\$2,616	\$32,804	\$14,942	\$71,719	\$219,362	\$158,762	\$102,461	\$326,369	\$1,304	\$46,433
All other fuel	\$144,636	\$19,004	\$1,016	\$5,125	\$2,486	\$1,970	\$67,139	\$10,371	\$4,429	\$28,211	.....	\$4,385
Rent of power and heat	\$62	.....	.....	.....	.....	.....	.....	.....	.....	\$62	.....	.....
Lumber, casks, barrels, boxes, and nails	\$2,778,025	\$104,589	\$941,894	\$15,868	\$12,191	\$17,840	\$193,850	\$127,827	\$211,651	\$1,026,513	\$107,050	\$18,812
Cartons, wrapping paper, straw, and hay	\$612,602	\$22,571	\$290,525	\$3,026	\$4,193	\$2,773	\$22,390	\$22,305	\$49,770	\$161,012	\$32,562	\$1,475
Caps, metal trimmings, and rubber supplies	\$1,522,917	\$31,073	\$747,574	\$10,494	\$6,816	.....	\$79,359	\$67,111	\$61,212	\$405,045	\$101,983	\$12,260
Supplies used in repairs on tanks and furnaces	\$531,916	\$36,659	\$145,667	\$2,107	\$2,803	\$14,073	\$47,089	\$30,524	\$19,174	\$205,665	\$16,422	\$11,733
Mill supplies	\$138,434	\$1,120	\$56,846	\$2,567	\$692	\$1,938	\$3,707	\$3,528	\$9,004	\$49,169	\$8,690	\$1,107
All other materials	\$991,751	\$31,672	\$137,133	\$12,463	\$20,679	\$30,906	\$109,335	\$78,950	\$43,746	\$458,507	\$63,628	\$4,732
Freight	\$894,088	\$24,143	\$220,935	\$6,177	\$2,012	\$7,316	\$71,950	\$29,924	\$63,449	\$406,774	\$32,097	\$20,812

¹ Includes establishments distributed as follows: California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1.

TABLE 12.—GLASS MANUFACTURE, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	Missouri.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states. ¹
Products:												
Aggregate value.....	\$56,539,712	\$2,834,398	\$14,757,883	\$557,895	\$418,468	\$765,564	\$5,093,822	\$2,756,978	\$4,547,038	\$22,011,130	\$1,871,795	\$924,706
Building glass—												
Total value.....	\$17,096,234	\$24,000	\$5,711,948	\$103,262	\$16,200	\$505,564	\$274,011	\$346,790	\$671,422	\$9,213,545	\$101,242	\$128,250
Window glass, 50-foot boxes.....	4,341,282	4,000	1,701,729	49,669	6,000	.....	124,541	89,622	200,854	2,068,340	40,144	56,483
Value.....	\$10,879,355	\$24,000	\$4,176,537	\$103,262	\$15,000	.....	\$267,611	\$243,085	\$519,187	\$5,301,131	\$101,242	\$128,250
Plate glass—												
Total cast, square feet.....	34,758,994	.....	8,553,838	.....	.....	5,628,800	.....	543,282	486,340	19,546,674	.....	.....
Rough sold, square feet.....	628,684	.....	31,917	.....	.....	16,862	.....	.....	.....	579,905	.....	.....
Value.....	\$75,887	.....	\$4,780	.....	.....	\$3,075	.....	.....	.....	\$68,082	.....	.....
Polished plate made, square feet.....	16,883,578	.....	5,177,160	.....	.....	455,222	.....	.....	378,946	10,877,250	.....	.....
Value.....	\$5,158,598	.....	\$1,415,224	.....	.....	\$162,062	.....	.....	\$149,578	\$3,441,734	.....	.....
Cathedral, square feet.....	8,846,361	.....	2,000,000	.....	.....	5,103,079	.....	543,282	.....	1,200,000	.....	.....
Value.....	\$567,252	.....	\$100,000	.....	.....	\$349,558	.....	\$46,694	.....	\$71,000	.....	.....
Skylight, square feet.....	3,679,694	.....	5,616	.....	.....	10,976	.....	.....	26,566	3,636,536	.....	.....
Value.....	\$165,086	.....	\$357	.....	.....	\$869	.....	.....	\$2,657	\$161,203	.....	.....
Wire, square feet.....	1,295,504	.....	.....	.....	.....	.....	.....	.....	.....	1,295,504	.....	.....
Value.....	\$129,051	.....	.....	.....	.....	.....	.....	.....	.....	\$129,051	.....	.....
All other building glass.....	\$121,005	.....	\$15,000	.....	\$1,200	.....	\$6,400	\$57,011	.....	\$41,394	.....	.....
Pressed and blown glass—												
Total value.....	\$17,076,125	\$181,618	\$2,691,787	\$100,000	\$382,091	.....	\$21,800	\$1,173,784	\$2,738,289	\$8,463,550	\$1,379,706	\$4,000
Tableware, 100 pieces.....	655,141	.....	126,162	.....	.....	.....	.....	.....	150,992	364,770	13,217	.....
Value.....	\$2,617,784	.....	\$291,060	.....	.....	.....	.....	.....	\$668,469	\$1,588,870	\$72,385	.....
Jellies, tumblers, and goblets, dozens.....	8,544,050	.....	3,050,595	340,000	.....	.....	.....	.....	1,681,584	3,112,588	359,288	.....
Value.....	\$2,007,386	.....	\$630,485	\$100,000	.....	.....	.....	.....	\$392,612	\$793,902	\$90,387	.....
Lamps, dozens.....	807,765	.....	81,972	.....	2,020	.....	.....	15,509	.....	191,084	455,543	61,547
Value.....	\$1,498,675	.....	\$43,116	.....	\$4,000	.....	.....	\$7,447	.....	\$185,297	\$983,452	\$275,368
Chimneys, dozens.....	6,901,192	173,931	3,113,228	.....	.....	.....	.....	186,800	1,508,114	1,836,119	.....	.....
Value.....	\$2,719,583	\$131,618	\$1,196,996	.....	\$33,000	.....	.....	\$96,707	\$622,721	\$638,541	.....	.....
Lantern globes, dozens.....	1,044,816	.....	547,971	.....	2,000	.....	.....	162,038	142,800	68,275	131,732	.....
Value.....	\$497,021	.....	\$176,150	.....	\$1,800	.....	.....	\$180,629	\$69,589	\$26,920	\$32,933	.....
Shades, globes, gas and electric goods, dozens.....	2,678,854	.....	15,052	.....	23,300	.....	41,666	312,500	1,397,824	856,125	27,387	.....
Value.....	\$2,497,885	.....	\$19,044	.....	\$40,000	.....	\$6,500	\$520,000	\$398,420	\$1,462,248	\$61,673	.....
Blown tumblers, stemware, and bar goods, dozens.....	6,127,367	.....	112,163	.....	.....	.....	.....	.....	214,072	3,512,552	2,288,580	.....
Value.....	\$1,598,652	.....	\$37,701	.....	.....	.....	.....	.....	\$53,368	\$1,107,489	\$400,091	.....
Opal ware, dozens.....	3,750,443	.....	.....	.....	3,000	.....	.....	1,000	.....	96,597	2,925,545	479,428
Value.....	\$1,581,731	.....	\$90,322	.....	\$4,000	.....	.....	\$1,500	.....	\$51,656	\$1,214,472	\$219,781
Cut glass, dozens.....	134,726	.....	325	.....	3,322	.....	.....	.....	.....	2,900	56,800	71,369
Value.....	\$672,463	.....	\$600	.....	\$146,613	.....	.....	.....	\$126,000	\$31,189	\$88,061	.....
All other pressed and blown glass.....	\$1,384,945	.....	\$206,313	.....	\$152,678	.....	\$14,800	\$358,501	\$170,157	\$339,467	\$139,029	\$4,000
Bottles and jars—												
Total value.....	\$21,676,791	\$2,678,780	\$6,327,468	\$346,633	\$20,167	\$260,000	\$4,452,219	\$1,195,276	\$1,058,955	\$4,162,990	\$381,847	\$792,456
Prescription vials and druggists' wares, gross.....	2,423,932	265,918	624,128	20,000	.....	.....	731,107	81,803	76,409	551,236	4,004	69,327
Value.....	\$4,665,697	\$404,799	\$1,184,397	\$94,633	.....	.....	\$1,306,316	\$203,734	\$155,377	\$1,170,061	\$8,889	\$137,401
Beers, sodas, and minerals, gross.....	1,351,118	406,037	109,194	18,004	128	70,000	108,247	134,364	219,422	147,145	25,000	118,577
Value.....	\$5,075,068	\$1,332,842	\$347,836	\$120,212	\$626	\$260,000	\$403,661	\$496,393	\$637,428	\$61,129	\$92,000	\$478,936
Liquors and flasks, gross.....	985,374	31,168	604,798	5,000	6,298	.....	64,140	44,171	16,400	142,518	43,058	27,828
Value.....	\$2,403,447	\$131,869	\$1,207,519	\$20,000	\$19,541	.....	\$153,165	\$110,221	\$57,350	\$448,182	\$169,852	\$35,743
Milk jars, gross.....	146,142	7,500	10,561	.....	.....	.....	19,798	6,933	.....	80,435	4,000	1,260
Value.....	\$729,008	\$37,500	\$55,344	.....	.....	.....	\$107,431	\$33,833	\$30,000	\$434,310	\$23,000	\$7,600
Fruit jars, gross.....	789,298	1,500	559,549	.....	.....	.....	61,871	31,235	2,000	15,000	14,643	3,500
Value.....	\$2,935,036	\$9,000	\$2,106,260	.....	.....	.....	\$192,467	\$128,965	\$8,000	\$436,104	\$43,750	\$10,500
Patent and proprietary, gross.....	1,296,131	302,708	244,343	500	.....	.....	601,276	57,224	20,000	55,080	.....	15,000
Value.....	\$2,602,976	\$495,597	\$378,301	\$1,500	.....	.....	\$1,399,042	\$120,543	\$35,800	\$142,193	.....	\$30,000
Packers and preservers, gross.....	784,588	80,739	247,731	5,007	.....	.....	278,960	11,430	25,000	113,546	10,242	11,933
Value.....	\$2,119,221	\$195,691	\$636,092	\$16,021	.....	.....	\$620,869	\$33,706	\$100,000	\$419,947	\$20,356	\$27,539
Demijohns and carboys, dozens.....	83,243	20,136	.....	.....	.....	.....	18,699	10,929	.....	17,815	.....	6,074
Value.....	\$206,061	\$48,984	.....	.....	.....	.....	\$36,045	\$13,896	.....	\$36,854	.....	\$14,682
All other bottles and jars.....	\$940,277	\$22,498	\$361,729	\$95,267	.....	.....	\$177,623	\$49,950	\$35,000	\$174,210	\$24,000	.....
Value of all other products.....	\$690,562	.....	\$26,680	\$8,000	.....	.....	\$346,292	\$41,128	\$78,417	\$181,045	\$9,000	.....
Comparison of products:												
Number of establishments reporting for both years.....	252	6	63	7	3	3	23	23	21	88	10	5
Value for census year.....	\$47,184,649	\$2,834,398	\$11,157,894	\$557,895	\$382,091	\$765,564	\$4,927,447	\$2,638,302	\$4,138,150	\$17,347,849	\$1,628,027	\$506,432
Value for preceding business year.....	\$41,959,668	\$2,297,079	\$10,056,153	\$532,723	\$430,549	\$1,034,263	\$4,539,903	\$2,350,494	\$3,316,665	\$15,334,075	\$1,371,352	\$645,762
Equipment and characteristics of works:												
Pot furnaces—												
Operated, number.....	391	9	116	10	4	4	27	24	37	143	14	3
Pots, number.....	4,300	117	1,220	91	33	60	200	200	444	1,758	144	23
Idle, number.....	60	1	9	2	3	3	6	5	5	25	1	.....
Pots, number.....	807	12	134	16	27	50	55	47	95	359	12	.....
Tanks—												
Continuous—												
Operated, number.....	192	11	71	.....	.....	3	31	14	12	43	.....	7
Rings, number.....	1,671	133	564	.....	.....	20	293	115	95	404	.....	47
Pot capacity, number.....	3,775	266	1,807	.....	.....	43	610	280	212	1,013	.....	94
Idle, number.....	14	.....	4	.....	.....	2	6	.....	.....	1	.....	.....
Rings, number.....	79	.....	12	.....	.....	15	40	.....	.....	8	.....	4
Pot capacity, number.....	158	.....	24	.....	.....	30	80	.....	.....	16	.....	8

¹ Includes establishments distributed as follows: California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1.

MANUFACTURES.

TABLE 12.—GLASS MANUFACTURE, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	Missouri.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states. ¹
Equipment and characteristics of works—Continued.												
Intermittent or day—												
Operated, number.....	190	7	38	1	1		12	7	3	44	19	8
Tons capacity, number.....	818	40	208	6	90		72	49	13	232	85	23
Pot capacity, number.....	818	40	208	6	90		72	49	13	232	85	23
Idle, number.....	17		4				2	1	3	5	1	1
Tons capacity, number.....	83		12				7	3	12	42	5	2
Pot capacity, number.....	83		12				7	3	12	42	5	2
Building glass—												
Flattening ovens, number.....	285	1	116	2	1		6	5	12	138	2	2
Monkey ovens, number.....	2	2										
Blow furnaces, number.....	259		135		1			10	15	94	4	
Casting tables, number.....	100	4	17			14		5	3	57		
Annealing ovens, number.....	869		258			98		5	23	485		
Bending ovens, number.....	9		5							4		
Lehrs, number.....	302		115	2	1	2	5	12	13	147	3	2
Clay grinding mills, number.....	63		22	2	1	1	8	6	3	23	1	1
Grinding machines, number.....	227		61	1		21		3	12	129		
Polishing machines, number.....	294		86			24			10	174		
Sand-blast machines, number.....	5		1					1		3		
Glassware and bottles—												
Shops, number.....	3,978	427	1,397	67	38	26	718	312	618	144	158	78
Glory holes, number.....	1,419	146	351	24	16	6	301	66	93	351	28	37
Annealing ovens, number.....	1,540	289	161	21	15	32	266	126	121	395	18	96
Lehrs, number.....	1,025	31	321	18	12		95	55	102	323	59	9
Decorating kilns, number.....	105		6	1	8			1	27	55	7	
Decorating lehrs, number.....	23		1						4	15	3	
Presses, hand, number.....	915	13	197	7	9		55	49	125	402	67	1
Presses, mechanical, number.....	49		4							42	3	
Blowing machines, number.....	169	1	80				4	1	18	65		
Finishing machines, number.....	140	2	83				1	2	59	42	1	
Crimping machines, number.....	494	1	169		5			32	35	252		
Mechanical polishers, number.....	16				1		1	1	1	12		
Sand-blast machines, number.....	68	1	8		3		1	9	10	27	9	
Grinding machines for fruit-jar tops, number.....	137	8	29	4			22	9	5	54	10	1
Clay-grinding mills, number.....	8		1				1	2	2	4		
Mechanical stokers, number.....	79						3	14	8	52		2
Horses and mules, number.....	409	23	21	13	8	9	98	49	18	134	6	30
Wagons, carts, and drays, number.....	407	24	23	17	9	7	111	47	18	126	6	19
Power:												
Number of establishments reporting.....	330	6	99	7	4	3	25	25	27	112	14	8
Total horsepower.....	58,929	700	11,386	240	199	3,592	1,756	1,127	7,326	30,956	958	689
Owned—												
Engines—												
Steam, number.....	753	14	187	9	4	17	69	33	38	353	17	12
Horsepower.....	49,791	700	10,333	230	100	3,110	1,681	1,017	3,426	27,732	773	639
Gas, or gasoline, number.....	84		23		1		1	1	13	41	4	
Horsepower.....	2,364		585		7		5	50	235	1,322	160	
Water wheels, number.....	2				1					1		
Horsepower.....	27				12					15		
Electric motors, number.....	178		18	1	1	15			45	97	1	
Horsepower.....	5,986		468	10	40	482			3,605	1,361	20	
Other power, number.....	25						4	4	6	10	1	
Horsepower.....	705						70	60	60	510	5	
Rented—												
Electric, horsepower.....	44				40					4		
Other kind, horsepower.....	12									12		
Furnished to other establishments, horsepower.....	10							10				
Establishments classified by number of persons employed, not including proprietors and firm members:												
Total number of establishments.....	355	6	110	7	5	3	26	27	28	119	16	8
Under 5.....	1										1	
5 to 20.....	5	1	2						1	1		
21 to 50.....	33		7		1		3	9	2	8	3	
51 to 100.....	93		39	3	2		5	7	3	24	5	5
101 to 250.....	139	1	43	8	2	1	11	7	12	55	3	1
251 to 500.....	58	2	14	1		2	3	4	8	18	4	2
501 to 1,000.....	21		4				3		2	12		
Over 1,000.....	5	2	1				1			1		

¹Includes establishments distributed as follows: California, 1; Colorado, 1; Delaware, 1; Georgia, 1; Michigan, 1; Virginia, 2; Wisconsin, 1.

TABLE 13.—BUILDING GLASS, BY STATES: 1900.

	United States.	Indiana.	New Jersey.	New York.	Ohio.	Pennsylvania.	All other states. ¹
Number of establishments.....	124	51	4	7	7	46	9
Character of organization:							
Individual.....	6	2	1	1	2	7	1
Firm and limited partnership.....	11	1	1	1	1	7	2
Incorporated company.....	102	45	2	6	5	38	6
Miscellaneous.....	5	4				1	
Capital:							
Total.....	\$26,617,122	\$7,080,415	\$218,990	\$834,085	\$2,039,134	\$14,661,120	\$2,283,428
Land.....	\$2,170,678	\$385,283	\$25,000	\$16,450	\$212,194	\$1,275,513	\$253,238
Buildings.....	\$9,020,800	\$2,810,636	\$81,000	\$71,500	\$486,931	\$4,831,176	\$739,567
Machinery, tools, and implements.....	\$9,523,538	\$2,162,630	\$14,500	\$35,150	\$391,209	\$5,425,846	\$891,153
Cash and sundries.....	\$5,902,106	\$1,721,816	\$95,490	\$207,935	\$348,800	\$3,128,585	\$399,480
Proprietors and firm members.....	25	2	4	6	2	8	3
Salaried officials, clerks, etc.:							
Total number.....	615	224	8	11	25	307	40
Total salaries.....	\$311,983	\$274,105	\$6,326	\$15,160	\$22,570	\$485,015	\$68,807
Officers of corporations—							
Number.....	87	32	1	2	5	41	6
Salaries.....	\$311,672	\$105,898	\$1,200	\$4,700	\$7,825	\$173,449	\$18,600
General superintendents, managers, clerks, etc.—							
Total number.....	528	192	7	9	20	266	34
Total salaries.....	\$500,311	\$168,207	\$5,126	\$10,460	\$14,746	\$261,566	\$40,207
Men—							
Number.....	485	178	6	8	18	245	30
Salaries.....	\$476,169	\$159,904	\$4,970	\$10,096	\$14,295	\$248,707	\$38,197
Women—							
Number.....	43	14	1	1	2	21	4
Salaries.....	\$24,142	\$8,803	\$156	\$304	\$450	\$12,859	\$2,010
Wage-earners, including pieceworkers, and total wages:							
Greatest number employed at any one time during the year.....	19,343	6,512	389	313	1,021	10,031	1,077
Least number employed at any one time during the year.....	16,059	5,519	242	263	912	8,379	744
Average number.....	11,902	3,912	290	228	477	6,469	695
Total wages.....	\$9,029,673	\$3,251,519	\$168,245	\$164,291	\$376,006	\$4,706,720	\$367,592
Men, 16 years and over—							
Average number.....	11,801	3,908	230	226	477	6,868	592
Wages.....	\$8,999,613	\$3,250,119	\$168,245	\$168,979	\$376,006	\$4,679,801	\$366,469
Women, 16 years and over—							
Average number.....	20					20	
Wages.....	\$4,901					\$4,901	
Children, under 16 years—							
Average number.....	81	4		2		71	4
Wages.....	\$25,159	\$1,700		\$312		\$22,018	\$1,129
Average number of wage-earners, including pieceworkers, employed during each month:							
Men, 16 years and over—							
January.....	16,698	5,865	357	297	737	8,840	547
February.....	16,919	6,012	357	298	730	8,985	492
March.....	16,748	5,461	357	305	955	9,175	490
April.....	16,957	5,457	378	292	951	9,224	490
May.....	17,152	5,806	394	284	932	8,893	543
June.....	14,408	5,370	249	31	91	7,846	548
July.....	5,584	1,558	37	59	4	3,243	633
August.....	5,717	1,645	37	45	10	3,367	727
September.....	5,761	1,922	13	169	192	3,218	242
October.....	7,573	2,447	105	285	220	4,086	426
November.....	8,241	2,605	240	296	229	4,402	469
December.....	9,823	2,845	260	297	649	5,227	545
Women, 16 years and over—							
January.....	25					25	
February.....	24					24	
March.....	27					27	
April.....	22					22	
May.....	18					18	
June.....	18					18	
July.....	18					18	
August.....	16					16	
September.....	17					17	
October.....	21					21	
November.....	18					18	
December.....	24					24	
Children, under 16 years—							
January.....	91	3		2		82	4
February.....	94	5		2		88	4
March.....	91	4		2		81	4
April.....	93	5		2		82	4
May.....	92	5		2		75	10
June.....	91	6		2		73	10
July.....	76	4		2		64	8
August.....	80	4		2		66	6
September.....	58	4		2		52	
October.....	62	3		2		57	
November.....	69	3		2		64	
December.....	77	4		2		71	
Miscellaneous expenses:							
Total.....	\$1,305,865	\$348,665	\$12,141	\$14,569	\$19,505	\$367,168	\$103,817
Rent of works.....	\$6,314			\$1,200		\$4,460	\$654
Taxes, not including internal revenue.....	\$104,969	\$32,387	\$841	\$310	\$2,291	\$1,989	\$6,651
Rent of offices, insurance, interest, and all sundry expenses not hitherto included.....	\$1,248,457	\$316,278	\$11,300	\$11,882	\$17,214	\$790,271	\$96,512
Contract work.....	\$11,125			\$677		\$10,448	
Materials used:							
Aggregate cost.....	\$4,679,084	\$1,319,675	\$36,720	\$120,748	\$158,526	\$2,097,041	\$296,374
Glass sand, tons.....	177,966	59,746	2,763	2,977	5,851	95,176	11,453
Soda ash (carbonate of soda), tons.....	\$298,879	\$102,019	\$2,833	\$3,773	\$7,886	\$172,003	\$10,415
Soda ash (sulphate of soda), tons.....	25,500	8,037	615	59	666	13,206	2,917
Salt cake (sulphate of soda), tons.....	\$338,524	\$106,833	\$11,396	\$1,433	\$9,669	\$108,022	\$41,181
Nitrate of soda, tons.....	52,789	14,158	500	1,453	84,239	84,239	688
Limestone, tons.....	\$512,835	\$180,018	\$5,700	\$13,605	\$18,428	\$286,548	\$8,586
Lime, hundred weights.....	614	50		23		541	
Lime, hundred weights.....	\$9,262	\$1,875		\$1,056		\$6,331	
Lime, hundred weights.....	\$0,274	18,911	350	917	1,932	34,910	3,204
Lime, hundred weights.....	\$106,540	\$31,937	\$350	\$1,821	\$3,102	\$62,380	\$6,603
Lime, hundred weights.....	125,030	12,060	72,922	3,150		20,185	16,713
Lime, hundred weights.....	\$12,315	\$1,745	\$2,373		\$482	\$3,919	\$3,796

¹ Includes establishments distributed as follows: Illinois, 1; Maryland, 2; Massachusetts, 1; Missouri, 2; West Virginia, 2; Delaware, 1.

TABLE 13.—BUILDING GLASS, BY STATES: 1900—Continued.

	United States.	Indiana.	New Jersey.	New York.	Ohio.	Pennsylvania.	All other states. ¹
Materials used—Continued.							
Aggregate cost—Continued.							
Arsenic, pounds.....	1,821,180	517,889	5,085	40,552	105,243	610,807	41,004
Cost.....	\$68,067	\$25,867	\$280	\$2,066	\$4,875	\$27,923	\$2,056
Carbon, tons.....	3,973	1,847	.....	47	183	1,912	34
Cost.....	\$14,499	\$6,135	.....	\$310	\$660	\$6,749	\$645
Manganese, pounds.....	68,600	13,000	.....	1,200	.....	20,400	34,000
Cost.....	\$2,316	\$735	.....	\$63	.....	\$643	\$875
Litharge (red lead), pounds.....	35,521	1,000	.....	31,221	.....	2,700	600
Cost.....	\$2,278	\$60	.....	\$2,023	.....	\$148	\$42
Potash or pearlsh, pounds.....	70,383	10,000	.....	54,748	.....	5,635	.....
Cost.....	\$3,704	\$510	.....	\$2,951	.....	\$243	.....
Grinding sand, tons.....	263,933	70,853	.....	.....	6,800	181,537	4,743
Cost.....	\$160,305	\$36,811	.....	.....	\$2,040	\$119,557	\$1,897
Rouge, pounds.....	835,749	267,345	.....	.....	14,900	532,524	20,980
Cost.....	\$24,448	\$9,061	.....	.....	\$723	\$13,971	\$693
Plaster of paris, tons.....	22,980	7,626	.....	.....	600	14,157	597
Cost.....	\$107,434	\$34,610	.....	.....	\$1,200	\$67,807	\$3,817
Fire clay or pot clay, pounds.....	23,510,700	7,282,228	196,840	288,750	1,603,910	13,365,852	773,120
Cost.....	\$170,522	\$57,310	\$2,148	\$2,438	\$4,749	\$97,832	\$6,045
Pots (not including those made at works), number.....	3,830	1,482	65	332	336	1,366	249
Cost.....	\$101,061	\$45,035	\$1,300	\$10,395	\$9,110	\$25,641	\$9,580
Flattening stones, number.....	272	79	14	1	24	146	8
Cost.....	\$16,344	\$5,010	\$315	\$60	\$1,550	\$9,049	\$360
Fuel—							
Total cost.....	\$1,119,022	\$195,376	\$30,343	\$42,741	\$35,772	\$710,415	\$104,375
Natural gas.....	\$751,354	\$193,590	.....	.....	\$11,212	\$535,070	\$11,482
Oil, gallons.....	723,654	489	133,414	54,171	113	177,256	358,211
Cost.....	\$23,161	\$78	\$4,070	\$2,742	\$25	\$5,679	\$10,667
Coal, tons.....	269,611	432	12,406	20,769	28,593	161,368	46,043
Cost.....	\$335,856	\$1,138	\$24,905	\$37,450	\$24,323	\$166,866	\$31,174
All other fuel.....	\$8,651	\$570	\$1,368	\$2,549	\$2,812	\$2,800	\$1,152
Lumber, casks, barrels, boxes, and nails.....	\$727,663	\$257,905	\$11,340	\$14,546	\$33,227	\$378,557	\$32,084
Cartons, wrapping paper, straw, and hay.....	\$43,897	\$13,252	.....	.....	\$1,247	\$23,890	\$3,817
Supplies used in repairs on tanks and furnaces.....	\$247,538	\$72,010	\$2,650	\$2,531	\$7,666	\$152,213	\$10,468
Mill supplies.....	\$65,616	\$37,290	\$240	\$550	\$1,460	\$24,315	\$1,761
All other materials.....	\$296,155	\$56,922	\$4,788	\$9,417	\$4,995	\$184,630	\$35,373
Freight.....	\$234,855	\$41,299	.....	\$3,293	\$9,785	\$154,205	\$11,914
Products:²							
Total value.....	\$17,096,234	\$5,711,948	\$274,011	\$346,790	\$671,422	\$9,213,545	\$378,518
Building glass—							
Window, 50-foot boxes.....	4,341,282	1,701,729	124,541	89,522	200,854	2,068,340	156,296
Value.....	\$10,879,355	\$4,176,587	\$207,611	\$243,085	\$519,187	\$5,301,131	\$371,751
Plate—							
Total cast, square feet.....	34,758,994	8,553,838	.....	.....	.....	19,546,074	6,658,482
Rough sold, square feet.....	628,681	31,917	.....	.....	.....	679,905	16,862
Value.....	\$75,887	\$4,780	.....	.....	.....	\$68,032	\$3,075
Polished plate made, square feet.....	16,833,578	5,177,160	.....	.....	.....	10,877,250	329,168
Value.....	\$5,163,598	\$1,415,224	.....	.....	.....	\$3,441,784	\$301,640
Cathedral, square feet.....	8,846,361	.....	.....	.....	.....	.....	8,846,361
Value.....	\$567,252	.....	.....	.....	.....	.....	\$567,252
Skylight, square feet.....	3,679,694	.....	.....	.....	.....	3,636,536	43,158
Value.....	\$165,086	.....	.....	.....	.....	\$161,203	\$3,883
Wire, square feet.....	1,295,504	.....	.....	.....	.....	1,295,504	.....
Value.....	\$129,051	.....	.....	.....	.....	\$129,051	.....
Value of all other products.....	\$121,005	\$15,000	\$6,400	\$57,011	.....	\$41,394	\$1,200
Comparison of products:							
Number of establishments reporting for both years.....	59	20	3	5	5	20	6
Value for census year.....	\$9,574,171	\$3,088,363	\$204,011	\$251,714	\$478,017	\$4,790,490	\$761,076
Value for preceding business year.....	\$9,688,452	\$2,903,757	\$215,388	\$177,837	\$368,431	\$4,049,146	\$1,048,331
Equipment and characteristics of works:							
Pot furnaces—							
Operated, number.....	164	77	3	8	9	52	16
Pots, number.....	1,825	735	24	60	82	780	144
Idle, number.....	29	6	.....	1	4	14	6
Pots, number.....	471	90	.....	5	80	234	62
Tanks—							
Continuous—							
Operated, number.....	34	12	3	.....	.....	16	1
Rings, number.....	433	179	24	.....	.....	205	3
Pot capacity, number.....	1,299	537	72	.....	66	615	0
Intermittent, or day—							
Operated, number.....	13	1	.....	.....	.....	12	.....
Pots capacity, number.....	124	15	.....	.....	.....	109	.....
Pot capacity, number.....	124	15	.....	.....	.....	109	.....
Idle, number.....	1	.....	.....	.....	.....	1	.....
Pots capacity, number.....	7	.....	.....	.....	.....	7	.....
Pot capacity, number.....	7	.....	.....	.....	.....	7	.....
Flattening ovens, number.....	285	116	6	5	12	138	8
Monkey ovens, number.....	2	.....	.....	.....	.....	.....	2
Blow furnaces, number.....	259	135	.....	10	15	94	5
Casting tables, number.....	100	17	.....	5	3	57	18
Annealing ovens, number.....	869	258	.....	5	23	485	98
Bending ovens, number.....	9	6	.....	.....	.....	4	.....
Lehrs, number.....	302	115	5	12	13	147	10
Clay-grinding mills, number.....	63	22	3	6	3	23	6
Grinding machines, number.....	227	61	.....	3	12	129	22
Polishing machines, number.....	294	86	.....	.....	10	174	24
Sand-blast machines, number.....	5	1	.....	.....	.....	3	.....
Mechanical stokers, number.....	62	.....	.....	2	8	52	.....
Horses and mules, number.....	92	14	6	5	3	47	17
Wagons, carts, and drays, number.....	93	13	7	3	2	52	10
Power:							
Number of establishments reporting.....	111	45	4	7	6	41	8
Total horsepower.....	43,939	8,741	90	155	5,799	25,516	3,633
Owned—							
Engines—							
Steam, number.....	442	127	4	8	8	274	21
Horsepower.....	37,161	8,280	90	155	2,250	23,292	3,144
Gas or gasoline, number.....	25	7	.....	.....	3	15	.....
Horsepower.....	685	143	.....	.....	29	513	.....

¹Includes establishments distributed as follows: Illinois, 1; Maryland, 2; Massachusetts, 1; Missouri, 2; West Virginia, 2; Delaware, 1.

²While the aggregate value for the respective states is the aggregate value of products reported for building glass manufacture, this total can not be obtained by adding the amounts given, as the report of certain products has been suppressed to avoid disclosing the operations of individual establishments.

TABLE 13.—BUILDING GLASS, BY STATES: 1900—Continued.

	United States.	Indiana.	New Jersey.	New York.	Ohio.	Pennsylvania.	All other states. ¹
Power—Continued.							
Total horsepower—Continued.							
Owned—Continued.							
Water wheels, number	1						1
Horsepower	12						12
Electric motors, number	134	14			39	66	15
Horsepower	5,628	368			3,520	1,258	482
Other power, number	6					6	
Horsepower	440					440	
Rented—							
Electric, horsepower	1					1	
Other, horsepower	12					12	
Establishments classified by number of persons employed, not including proprietors and firm members:							
Total number of establishments	124	51	4	7	7	46	9
5 to 20	3	2					1
21 to 50	16	4	1	5	2	2	2
51 to 100	43	24	1	2		12	4
101 to 250	41	15	2		4	19	1
251 to 500	13	4			1	7	1
501 to 1,000	8	2				6	

¹ Includes establishments distributed as follows: Illinois, 1; Maryland, 2; Massachusetts, 1; Missouri, 2; West Virginia, 2; Delaware, 1.

TABLE 14.—PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1900.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states. ¹
Number of establishments	231	5	59	5	4	22	20	21	78	14	8
Character of organization:											
Individual	23		5			3	3	1	10	1	
Firm and limited partnership	49		1		1	3	4	4	24	3	3
Incorporated company	157	5	47	4	3	16	12	16	39	10	5
Miscellaneous	2		1				1				
Capital:											
Total	\$34,806,781	\$2,143,658	\$5,694,974	\$470,534	\$255,949	\$5,173,672	\$1,008,799	\$3,412,379	\$13,626,067	\$1,265,624	\$841,125
Land	\$2,600,798	\$65,157	\$240,812	\$32,081	\$33,000	\$302,136	\$226,225	\$223,181	\$1,314,384	\$72,042	\$86,800
Buildings	\$7,933,493	\$520,764	\$1,321,693	\$104,365	\$50,047	\$1,083,071	\$325,504	\$323,928	\$3,190,620	\$348,301	\$165,200
Machinery, tools, and implements	\$4,723,745	\$108,289	\$774,210	\$61,495	\$34,150	\$339,100	\$262,082	\$500,422	\$2,257,465	\$230,532	\$156,000
Cash and sundries	\$19,548,745	\$1,449,448	\$3,358,259	\$281,613	\$138,752	\$3,454,365	\$1,094,988	\$1,859,848	\$6,863,598	\$614,749	\$438,125
Proprietors and firm members	145		22		2	14	11	7	73	6	8
Salaries, officials, clerks, etc.:											
Total number	1,653	71	285	28	38	309	106	174	535	80	27
Total salaries	\$1,980,398	\$106,600	\$375,122	\$36,576	\$27,660	\$273,684	\$124,588	\$226,459	\$675,368	\$93,016	\$86,420
Officers of corporations—											
Number	802	12	87	6	7	50	27	25	66	17	5
Salaries	\$625,163	\$36,260	\$165,249	\$9,710	\$9,469	\$82,340	\$51,854	\$60,814	\$172,367	\$27,900	\$9,700
General superintendents, managers, clerks, etc.—											
Total number	1,351	59	198	22	31	259	79	149	469	63	22
Total salaries	\$1,355,230	\$70,340	\$209,873	\$26,866	\$18,191	\$196,294	\$73,184	\$165,645	\$503,001	\$65,116	\$26,720
Men—											
Number	1,162	56	164	20	22	228	73	121	406	50	22
Salaries	\$1,268,971	\$68,320	\$193,189	\$25,544	\$15,326	\$183,770	\$69,986	\$158,593	\$478,401	\$59,122	\$26,720
Women—											
Number	189	9	84	2	9	31	6	28	68	13	
Salaries	\$86,259	\$2,020	\$16,684	\$1,322	\$2,865	\$12,524	\$3,198	\$12,052	\$29,600	\$5,994	
Wage-earners, including pieceworkers, and total wages:											
Greatest number employed at any one time during the year	52,370	3,889	12,011	870	486	7,032	3,186	5,212	16,012	2,266	1,406
Least number employed at any one time during the year	37,601	3,639	9,150	631	327	4,895	2,110	3,395	10,775	1,891	1,238
Average number	40,916	3,291	9,103	657	375	5,153	2,328	4,069	12,961	1,886	1,093
Total wages	\$18,055,037	\$1,615,736	\$3,974,223	\$275,354	\$179,329	\$2,299,500	\$1,140,973	\$1,691,378	\$5,580,771	\$784,676	\$563,042
Men, 16 years and over—											
Average number	30,372	2,594	7,002	477	331	4,136	1,975	3,028	8,768	1,258	803
Wages	\$15,901,620	\$1,491,391	\$3,557,923	\$249,756	\$169,891	\$2,115,061	\$1,075,992	\$1,468,952	\$4,058,460	\$603,817	\$510,377
Women, 16 years and over—											
Average number	3,509	143	634	54	19	170	73	405	1,526	468	12
Wages	\$835,100	\$28,456	\$123,898	\$8,673	\$4,892	\$32,726	\$17,831	\$96,017	\$409,349	\$103,748	\$4,100
Children, under 16 years—											
Average number	7,035	549	1,467	126	25	847	230	636	2,637	160	278
Wages	\$1,318,317	\$95,930	\$236,497	\$16,925	\$5,046	\$151,713	\$47,150	\$126,409	\$512,962	\$27,111	\$48,565
Average number of wage-earners, including pieceworkers, employed during each month:											
Men, 16 years and over—											
January	34,589	3,008	8,091	516	343	4,987	2,191	3,345	9,840	1,302	966
February	34,811	3,005	8,128	528	368	5,027	2,100	3,389	9,943	1,357	966
March	35,403	3,000	8,386	579	390	5,053	2,302	3,533	9,858	1,362	1,000
April	35,057	2,980	8,560	593	303	4,475	2,428	3,576	9,799	1,357	986
May	33,510	2,939	7,922	590	323	4,630	2,387	3,358	9,169	1,309	883
June	31,439	2,791	7,317	588	310	4,392	2,257	3,240	8,637	1,095	812
July	12,245	657	2,363	164	222	1,332	909	1,205	4,631	507	205
August	14,751	660	2,638	196	239	946	988	1,622	6,043	1,214	205
September	29,484	3,025	6,243	457	344	3,913	1,672	3,070	8,555	1,377	828
October	33,300	3,020	7,859	504	373	4,660	1,959	3,302	9,416	1,381	826
November	34,801	3,036	8,256	495	403	5,076	2,205	3,312	9,611	1,397	980
December	35,080	3,003	8,267	514	417	5,092	2,236	3,333	9,637	1,437	984
Women, 16 years and over—											
January	3,795	179	792	53	15	153	71	431	1,640	448	13
February	3,855	177	768	58	19	159	67	439	1,707	458	13
March	3,957	177	810	62	19	166	83	437	1,677	463	13
April	3,868	177	806	57	20	160	90	479	1,603	463	13

¹ Includes establishments distributed as follows: California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1.

TABLE 14.—PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states. ¹
Average number of wage-earners, including pieceworkers, employed during each month—Continued.											
Women, 16 years and over—Con.											
May.....	3,468	167	625	58	20	181	98	427	1,451	433	13
June.....	3,325	152	623	54	18	182	84	402	1,866	423	16
July.....	1,837	24	197	25	8	147	44	193	1,007	176	16
August.....	2,515	24	253	50	14	98	60	251	1,247	503	15
September.....	3,411	172	442	59	21	135	56	414	1,555	557	.....
October.....	3,886	171	715	61	20	175	67	447	1,673	557	.....
November.....	4,117	177	801	61	24	261	80	451	1,681	565	16
December.....	4,072	177	782	56	24	223	79	445	1,709	561	16
Children, under 16 years—											
January.....	8,210	667	1,810	132	34	996	298	829	2,958	156	390
February.....	8,369	659	1,873	136	35	993	284	840	3,056	163	390
March.....	8,446	659	1,880	188	24	983	298	832	3,061	172	340
April.....	8,551	661	1,906	197	24	965	332	819	3,128	172	347
May.....	7,249	646	1,801	186	25	986	348	649	2,674	167	367
June.....	6,991	646	1,190	199	25	963	381	685	2,590	165	297
July.....	2,321	.....	620	5	6	169	116	82	1,261	77	85
August.....	3,270	.....	690	5	6	167	139	246	1,803	139	85
September.....	6,088	650	1,097	60	24	789	237	464	2,341	182	244
October.....	8,029	660	1,745	137	30	969	290	789	2,985	180	244
November.....	8,427	671	1,799	128	32	1,124	327	797	3,043	177	329
December.....	8,467	667	1,796	136	35	1,071	364	796	3,098	173	331
Miscellaneous expenses:											
Total.....	\$2,222,778	\$210,329	\$341,500	\$22,313	\$13,483	\$229,514	\$130,966	\$136,007	\$1,000,711	\$109,904	\$28,079
Rent of works.....	\$22,881	.....	\$780	.....	.....	\$688	\$7,745	\$68	\$8,005	\$400	\$5,200
Taxes, not including internal revenue.....	\$131,369	\$9,426	\$27,168	\$1,480	\$2,915	\$20,822	\$7,312	\$14,969	\$38,849	\$4,622	\$8,811
Rent of offices, insurance, interest, and all sundry expenses not hitherto included.....	\$2,020,692	\$200,908	\$309,557	\$20,333	\$10,568	\$201,600	\$103,487	\$120,970	\$933,174	\$102,932	\$16,668
Contract work.....	\$47,834	.....	\$4,000	.....	.....	\$6,409	\$12,392	.....	\$20,688	\$1,950	\$2,400
Materials used:											
Aggregate cost.....	\$12,051,925	\$664,858	\$3,262,466	\$120,759	\$130,095	\$1,401,980	\$778,842	\$1,094,638	\$3,738,422	\$557,368	\$302,497
Glass sand, tons.....	403,754	32,778	119,621	2,076	1,822	78,497	19,848	31,856	95,633	9,205	11,873
Cost.....	\$647,943	\$33,231	\$139,056	\$3,929	\$6,265	\$75,688	\$42,344	\$59,199	\$157,462	\$12,958	\$17,811
Soda ash (carbonate of soda), tons.....	132,279	11,942	40,592	1,263	189	20,015	7,449	10,406	33,192	2,796	4,435
Cost.....	\$1,921,405	\$163,694	\$579,088	\$19,080	\$5,217	\$299,245	\$112,158	\$147,128	\$471,136	\$42,751	\$81,369
Salt cake (sulphate of soda), tons.....	468	.....	213	.....	.....	197	.....	.....	58	.....	.....
Cost.....	\$5,755	.....	\$3,214	.....	.....	\$1,778	.....	.....	\$763	.....	.....
Nitrate of soda, tons.....	10,156	440	2,279	149	24	1,314	525	1,259	3,739	307	70
Cost.....	\$311,675	\$13,720	\$73,368	\$5,000	\$830	\$21,165	\$18,118	\$39,684	\$126,058	\$10,982	\$2,800
Limestone, tons.....	30,741	4,815	9,082	118	.....	8,227	1,545	1,874	3,899	325	1,856
Cost.....	\$75,177	\$9,912	\$15,895	\$319	.....	\$24,621	\$5,205	\$3,434	\$8,730	\$575	\$6,486
Lime, hundredweights.....	669,649	45,387	218,088	14,725	559	126,001	32,819	72,488	127,790	11,228	20,564
Cost.....	\$135,586	\$10,175	\$35,854	\$1,233	\$112	\$24,500	\$3,885	\$14,230	\$34,027	\$2,820	\$3,750
Arsenic, pounds.....	1,028,131	45,207	819,648	1,650	6,789	97,405	61,018	123,344	285,267	69,303	18,500
Cost.....	\$49,563	\$2,153	\$14,981	\$83	\$330	\$4,622	\$2,876	\$6,876	\$13,372	\$3,295	\$965
Carbon, tons.....	182	90	86	.....	.....	20	4	.....	14	12	8
Cost.....	\$2,501	\$1,018	\$422	.....	.....	\$406	\$234	.....	\$201	\$150	\$78
Manganese, pounds.....	1,424,938	58,338	508,980	11,167	8,101	143,465	39,521	76,117	437,131	55,944	32,624
Cost.....	\$55,177	\$1,910	\$18,920	\$566	\$207	\$5,674	\$3,737	\$8,672	\$16,831	\$2,239	\$1,421
Litharge (red lead), pounds.....	8,350,585	115,000	1,481,887	36,982	364,448	72,049	790,909	2,063,000	3,141,027	235,233	.....
Cost.....	\$487,927	\$6,200	\$76,155	\$1,857	\$24,497	\$3,918	\$46,114	\$117,035	\$191,568	\$28,533	.....
Potash or pearlash, pounds.....	4,335,828	.....	443,481	75,000	207,967	60,270	414,438	350,171	1,932,699	351,302	.....
Cost.....	\$183,143	.....	\$18,054	\$3,000	\$8,994	\$2,866	\$17,552	\$34,129	\$81,991	\$16,557	.....
Grinding sand, tons.....	1,505	.....	299	.....	.....	433	60	97	580	46	.....
Cost.....	\$5,735	.....	\$722	.....	.....	\$519	\$120	\$480	\$3,629	\$265	.....
Rouge, pounds.....	1,787	.....	.....	.....	.....	1,300	.....	87	.....	400	.....
Cost.....	\$299	.....	.....	.....	.....	\$41	.....	\$174	.....	\$84	.....
Plaster of Paris, tons.....	86	.....	34	.....	.....	.....	10	11	27	4	.....
Cost.....	\$1,097	.....	\$494	.....	.....	.....	\$71	.....	\$364	.....	.....
Fire clay or pot clay, pounds.....	8,640,317	662,000	1,342,070	141,300	26,158	1,912,005	744,450	946,000	2,560,394	134,940	271,000
Cost.....	\$50,661	\$4,960	\$7,084	\$717	\$120	\$11,727	\$5,935	\$2,306	\$16,990	\$1,437	\$385
Pots, not including those made at works, number.....	5,111	284	947	164	110	301	143	363	2,095	184	20
Cost.....	\$280,086	\$16,930	\$56,849	\$7,286	\$5,175	\$11,217	\$7,125	\$52,861	\$110,124	\$11,199	\$1,320
Fuel—											
Total cost.....	\$2,084,124	\$154,020	\$159,924	\$33,416	\$30,287	\$415,485	\$184,417	\$213,633	\$711,295	\$77,423	\$104,224
Natural gas.....	\$823,924	.....	\$157,963	.....	.....	.....	\$9,190	.....	\$481,833	\$75,534	.....
Oil, gallons.....	11,067,202	1,063,301	185	148,396	371,867	4,964,767	1,203,521	1,250,637	938,873	18,650	1,317,655
Cost.....	\$385,997	\$41,084	\$37	\$6,234	\$15,619	\$155,257	\$45,603	\$31,874	\$44,548	\$585	\$45,156
Coal, tons.....	485,852	113,475	520	12,815	8,416	92,520	48,190	48,316	139,116	1,271	20,213
Cost.....	\$738,218	\$94,232	\$1,478	\$22,089	\$12,782	\$194,467	\$121,302	\$78,138	\$159,503	\$1,304	\$52,933
All other fuel.....	\$136,985	\$18,704	\$446	\$5,093	\$1,886	\$65,771	\$8,322	\$4,217	\$25,411	\$62	\$6,135
Rent of power and heat and nails.....	\$2,050,362	\$103,089	\$688,929	\$12,239	\$11,851	\$182,510	\$113,281	\$178,424	\$647,956	\$100,424	\$10,659
Cartons, wrapping paper, straw, and hay.....	\$565,705	\$22,571	\$277,273	\$2,326	\$4,193	\$21,605	\$21,429	\$48,623	\$137,122	\$32,513	\$1,150
Caps, metal trimmings, and rubber supplies.....	\$1,522,917	\$31,073	\$747,674	\$10,494	\$6,816	\$79,359	\$67,111	\$61,212	\$405,045	\$101,983	\$12,250
Supplies used in repairs on tanks or furnaces.....	\$284,378	\$35,559	\$73,657	\$2,107	\$2,723	\$44,439	\$27,993	\$11,508	\$53,452	\$10,140	\$10,800
Mill supplies.....	\$72,818	\$1,076	\$19,556	\$2,486	\$687	\$8,407	\$2,978	\$7,604	\$24,854	\$3,680	\$1,430
All other materials.....	\$695,596	\$30,672	\$80,211	\$8,444	\$20,879	\$104,547	\$69,533	\$38,751	\$278,625	\$63,625	\$5,307
Freight.....	\$659,233	\$22,895	\$179,636	\$6,177	\$1,112	\$62,571	\$21,631	\$53,714	\$252,569	\$30,628	\$28,300
Products:											
Aggregate value.....	\$39,443,478	\$2,810,398	\$9,045,935	\$454,633	\$402,258	\$4,819,811	\$2,410,188	\$3,875,661	\$12,797,585	\$1,770,553	\$1,056,456
Pressed and blown glass—											
Total value.....	\$17,076,125	\$131,618	\$2,691,787	\$100,000	\$332,091	\$21,300	\$1,173,784	\$2,738,289	\$8,463,550	\$1,379,706	\$4,000
Tableware, 100 pieces.....	655,141	.....	126,162	.....	.....	.....	.....	150,992	364,770	13,217	.....
Value.....	\$2,617,784	.....	\$201,060	.....	.....	.....	.....	\$668,469	\$1,535,870	\$72,385	.....
Jellies, tumblers, and goblets, dozens.....	8,544,050	.....	3,050,595	.....	.....	.....	.....	1,681,584	3,112,588	359,233	.....
Value.....	\$2,007,386	.....	\$630,485	.....	.....	.....	.....	\$392,612	\$793,902	\$90,337	.....
Lamps, dozens.....	807,765	.....	81,972	.....	2,020	.....	15,599	191,084	455,548	61,547	.....
Value.....	\$1,498,675	.....	\$43,116	.....	\$4,000	.....	\$7,447	\$185,297	\$933,462	\$275,363	.....
Chimneys, dozens.....	6,901,192	173,931	3,113,228	.....	84,000	.....	186,800	1,508,114	1,835,119	.....	.....
Value.....	\$2,719,583	\$131,618	\$1,196,996	.....	\$33,000	.....	\$96,707	\$622,721	\$638,541	.....	.....
Lantern globes, dozens.....	1,044,816	.....	547,871	.....	2,000	.....	162,038	142,800	58,275	131,732	.....
Value.....	\$497,021	.....	\$176,150	.....	\$1,800	.....	\$189,629	\$69,589	\$26,920	\$32,933	.....

¹Includes establishments distributed as follows: California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1.

TABLE 14.—PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states. ¹
Products—Continued.											
Pressed and blown glass—Con.											
Shades, globes, and gas and electric goods, dozens.....	2, 673, 854		15, 052		23, 300	41, 666	\$12, 500	1, 397, 824	856, 125	27, 387	
Value.....	\$2, 497, 885		\$19, 044		\$40, 000	\$6, 500	\$520, 000	\$398, 420	\$1, 452, 248	\$61, 673	
Blown tumblers, stemware, and bar goods, dozens.....	6, 127, 367		112, 163					214, 072	3, 512, 552	2, 288, 580	
Value.....	\$1, 598, 652		\$37, 701					\$53, 368	\$1, 107, 489	\$400, 000	
Opal ware, dozens.....	3, 750, 443		244, 873		3, 000		1, 000	96, 597	2, 925, 545	479, 428	
Value.....	\$1, 581, 731		\$90, 322		\$4, 000		\$1, 500	\$51, 656	\$1, 214, 472	\$219, 781	
Cut glass, dozens.....	184, 726		325		3, 332			2, 900	66, 800	71, 369	
Value.....	\$672, 463		\$900		\$146, 613			\$126, 000	\$311, 189	\$38, 061	
All other products for this group.....	\$1, 884, 945		\$206, 313		\$152, 678	\$14, 800	\$358, 501	\$170, 157	\$339, 467	\$139, 029	\$4, 000
Bottles and jars—											
Total value.....	\$21, 676, 791	\$2, 678, 780	\$6, 327, 468	\$346, 638	\$20, 167	\$4, 452, 219	\$1, 195, 278	\$1, 058, 955	\$4, 182, 990	\$381, 847	\$1, 052, 456
Prescription vials, and druggists' ware, gross.....	2, 423, 982	265, 918	624, 128	20, 000		781, 107	81, 808	76, 409	551, 236	4, 004	69, 327
Value.....	\$4, 665, 697	\$404, 799	\$1, 184, 397	\$94, 638		\$1, 806, 316	\$203, 784	\$155, 377	\$1, 170, 061	\$8, 889	\$137, 491
Beers, sodas, and minerals, gross.....	1, 851, 118	406, 037	109, 194	13, 004	128	108, 247	184, 864	219, 422	147, 145	25, 000	188, 577
Value.....	\$5, 075, 068	\$1, 382, 842	\$347, 886	\$120, 212	\$926	\$408, 661	\$495, 898	\$637, 428	\$901, 129	\$92, 000	\$788, 936
Liquors and flasks, gross.....	885, 374	31, 168	604, 798	5, 000	6, 293	64, 140	44, 171	16, 400	142, 518	43, 058	27, 823
Value.....	\$2, 408, 447	\$181, 869	\$1, 207, 519	\$20, 000	\$19, 541	\$153, 165	\$110, 221	\$57, 350	\$448, 182	\$169, 852	\$85, 748
Milk jars, gross.....	140, 142	7, 500	19, 561			19, 798	6, 338	6, 000	80, 485	4, 600	1, 260
Value.....	\$729, 008	\$37, 500	\$55, 844			\$107, 431	\$33, 863	\$30, 000	\$434, 310	\$23, 000	\$7, 500
Fruit jars, gross.....	789, 298	1, 500	559, 549			61, 871	31, 235	2, 000	115, 000	14, 648	3, 500
Value.....	\$2, 835, 036	\$9, 000	\$2, 106, 250	500		\$192, 457	\$128, 965	\$8, 000	\$436, 104	\$43, 750	\$10, 500
Patent and proprietary, gross.....	1, 296, 181	302, 708	244, 343		500	601, 272	57, 224	20, 000	55, 080		15, 000
Value.....	\$2, 602, 376	\$495, 597	\$378, 801	\$1, 500		\$1, 399, 046	\$120, 643	\$35, 800	\$142, 193		\$30, 000
Packers and preservers', gross.....	784, 588	80, 789	247, 781	5, 007		278, 950	11, 430	25, 000	113, 546	10, 242	11, 933
Value.....	\$2, 119, 221	\$195, 691	\$686, 092	\$15, 021		\$620, 859	\$33, 700	\$100, 000	\$419, 947	\$20, 356	\$27, 539
Demijohns and carboys, dozens.....	83, 243	29, 136				18, 689	10, 929		17, 815		6, 674
Value.....	\$206, 061	\$48, 984				\$36, 645	\$18, 896		\$36, 854		\$14, 682
All other products for this group.....	\$940, 277	\$22, 498	\$361, 729	\$85, 267		\$177, 623	\$49, 950	\$35, 000	\$174, 210	\$24, 000	
Value of all other products.....	\$690, 562		\$26, 680	\$8, 000		\$946, 628	\$41, 123	\$78, 417	\$181, 045	\$9, 000	
Comparison of products:											
Number of establishments reporting for both years.....	193	5	43	5	3	20	18	16	68	10	5
Value for census year.....	\$37, 610, 478	\$2, 810, 398	\$8, 069, 031	\$454, 633	\$382, 091	\$4, 723, 436	\$2, 387, 188	\$3, 660, 193	\$12, 557, 359	\$1, 628, 027	\$988, 182
Value for preceding business year.....	\$32, 291, 216	\$2, 278, 679	\$7, 147, 396	\$430, 845	\$430, 549	\$4, 324, 575	\$2, 172, 657	\$2, 948, 234	\$10, 434, 929	\$1, 371, 352	\$762, 000
Equipment and characteristics of works:											
Pot furnaces—											
Operated, number.....	227	8	39	6	3	24	16	28	91	11	1
Pots, number.....	2, 475	105	485	67	28	176	140	362	978	122	12
Idle, number.....	31	1	4	1	2	6	4	1	11	1	
Pots, number.....	336	12	44	12	19	55	42	15	125	12	
Tanks—											
Continuous—											
Operated, number.....	158	11	59			28	14	10	27		9
Rings, number.....	1, 238	133	385			269	115	73	199		64
Pot capacity, number.....	2, 476	266	770			538	280	140	398		123
Idle, number.....	14		4			6			1		3
Rings, number.....	79		12			40			8		19
Pot capacity, number.....	158		24			80			16		88
Intermittent or day—											
Operated, number.....	117	7	32	1	1	12	7	3	32	10	3
Tons capacity, number.....	694	40	193	6	90	72	49	18	123	85	23
Pot capacity, number.....	694	40	193	6	90	72	49	18	123	85	23
Idle, number.....	16		4			2	4		4		1
Tons capacity, number.....	76		12			7	3		12		2
Pot capacity, number.....	76		12			7	3		12		2
Shops, number.....	3, 978	427	1, 397	67	38	718	312	613	144	158	104
Glory holes, number.....	1, 419	140	351	24	16	301	66	93	351	23	43
Annealing ovens, number.....	1, 540	289	161	21	15	266	126	121	395	13	128
Lehrs, number.....	1, 025	31	321	18	12	95	55	102	323	59	9
Decorating kilns, number.....	105		6	1	8			27	5	7	
Decorating lehrs, number.....	23		1					4	15	3	
Presses, hand, number.....	915	18	197	7	9	55	49	125	402	57	1
Presses, mechanical, number.....	49		4					42	3		
Blowing machines, number.....	169	1	80			4	1	18	65		
Finishing machines, number.....	140	2	83			1	2	50	42	1	
Crimping machines, number.....	494	1	169			5	32	35	252		
Mechanical polishers, number.....	16		1			1	1	1	12		
Sand blast machines, number.....	68	1	8			1	1	10	27	9	
Grinding machines for fruit jar tops, number.....	137	3	29	4		22	9	5	54	10	
Clay grinding mills, number.....	8		1			1		2	4		
Mechanical stokers, number.....	17					3	12				
Horses and mules, number.....	317	23	7	8	7	92	44	15	87	5	29
Wagons, carts, and drays, number.....	314	24	20	11	8	104	44	6	74	5	18
Power:											
Number of establishments reporting.....	219	5	54	5	8	21	18	21	71	13	8
Total horsepower.....	14, 990	675	2, 645	207	187	1, 666	972	1, 527	5, 440	962	719
Owned—											
Engines—											
Steam, number.....	311	13	60	7	4	65	25	30	79	16	12
Horsepower.....	12, 630	675	2, 108	197	100	1, 591	862	1, 176	4, 440	767	719
Gas or gasoline, number.....	59		16		1	1		10	26	4	
Horsepower.....	1, 679		442		7	5		206	809	160	
Water wheels, number.....	1								1		
Horsepower.....	15								15		
Electric motors, number.....	44		4	1	1			6	31	1	
Horsepower.....	358		100	10	40			85	108	20	
Other power, number.....	19					4		6	4	1	
Horsepower.....	265					70		60	70	5	
Rented—											
Electric, horsepower.....	43				40				3		
Furnished to other establishments.....	10						10				

¹ Includes establishments distributed as follows: California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1.

MANUFACTURES.

TABLE 14.—PRESSED AND BLOWN GLASS AND BOTTLES AND JARS, BY STATES: 1900—Continued.

	United States.	Illinois.	Indiana.	Maryland.	Massachusetts.	New Jersey.	New York.	Ohio.	Pennsylvania.	West Virginia.	All other states. ¹
Establishments classified by number of persons employed, not including proprietors and firm members:											
Total number of establishments.....	281	5	59	5	4	22	20	21	78	14	8
Under 5.....	1								1		
5 to 20.....	2							1			
21 to 50.....	17		3			2	4		6	2	
51 to 100.....	50		15	1	2	4	5	3	12	4	4
101 to 250.....	98	1	28	3	2	9	7	8	36	3	1
251 to 500.....	45	2	10	1		3	4	7	11	4	3
501 to 1,000.....	13		2			3		2	6		1
Over 1,000.....	5	2	1			1			1		

¹ Includes establishments distributed as follows: California, 1; Colorado, 1; Georgia, 1; Michigan, 1; Missouri, 1; Virginia, 2; Wisconsin, 1.

TURPENTINE AND ROSIN.

. (1001)

TURPENTINE AND ROSIN.

By WILLIAM M. STEUART.

The gathering of resin, or crude turpentine, from the longleaf pine was among the first industries to attract the attention of the early settlers of the territory now forming the state of North Carolina. The primitive methods of gathering and shipping the resin as a raw material were followed by the manufacture of tar and pitch and the distillation of spirits of turpentine, the residuum being sold as rosin. The turpentine industry

has extended to other sections, and is now found in all regions in which the longleaf pine is found in sufficient abundance, and has formed an important feature in the industrial development of the South Atlantic and Eastern Gulf states. Table 1 is a comparative summary of the statistics for the industry as returned at the censuses of 1850 to 1900, with the percentages of increase for each decade.

TABLE 1.—COMPARATIVE SUMMARY, 1850 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	DATE OF CENSUS.					PER CENT OF INCREASE.					
	1900	1800	1880	1870	1860	1850	1800 to 1900	1880 to 1800	1870 to 1880	1860 to 1870	1850 to 1860
Number of establishments.....	1,503	670	508	227	625	856	124.3	31.9	123.8	163.7	127.0
Capital.....	\$11,847,495	\$4,062,375	\$1,866,390	\$902,225	\$4,013,758	\$1,663,692	191.6	117.7	106.9	177.5	141.3
Salaried officials, clerks, etc., number.....	1,889	249	(3)	(3)	(3)	(3)	3755.1				
Salaries.....	\$778,694	\$26,944	(3)	(3)	(3)	(3)	2790.0				
Wage-earners, average number.....	41,864	15,260	10,535	2,688	4,214	3,437	174.2	44.9	299.4	137.4	22.6
Total wages.....	\$8,338,433	\$2,906,547	\$1,628,061	\$476,284	\$770,696	\$447,348	188.8	79.1	240.8	138.2	72.3
Men, 16 years and over.....	41,375	16,081	9,955	2,526	4,079	3,369	175.3	51.0	294.1	138.1	21.1
Wages.....	\$8,338,044	\$2,891,302	(3)	(3)	(3)	(3)	188.4				
Women, 16 years and over.....	173	141	338	81	135	68	22.7	158.3	317.3	140.0	98.5
Wages.....	\$21,630	\$10,344	(3)	(3)	(3)	(3)	109.1				
Children, under 16 years.....	316	94	242	81	(3)	(3)	236.2	161.2	680.6		
Wages.....	\$33,809	\$4,811	(3)	(3)	(3)	(3)	602.7				
Miscellaneous expenses.....	\$476,171	\$178,662	(4)	(4)	(4)	(4)	166.5				
Cost of materials used.....	\$6,136,492	\$2,874,693	\$2,324,037	\$2,146,090	\$4,324,414	\$1,484,318	115.2	23.7	8.3	150.4	191.3
Value of products.....	\$20,344,888	\$8,077,379	\$5,876,933	\$3,585,225	\$6,468,369	\$2,355,657	151.9	37.4	63.9	144.6	120.5

¹ Decrease.

² Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See Table 7.)

³ Not reported separately.

⁴ Not reported.

In addition to the establishments included in the above table for 1900, there were, in the states of North Carolina and South Carolina, 20 establishments each reporting a product of less than \$500. The combined capital of these establishments was \$6,336, and the total value of their product, \$3,195.

The principal products of the industry are resin, which is the crude material obtained by tapping or bleeding the trees, spirits of turpentine, and rosin. The spirits of turpentine and the rosin are obtained by a distillation of the crude resin. Tar is obtained by the destructive distillation of the wood itself. Other products, such as oil of rosin, oil of tar, common pitch, brewers' pitch, etc., are obtained by a redistillation or combination of the products above mentioned. The early application of these products to shipbuilding gave rise to the generic term of "naval stores" as the designation of the industry, but as only a small proportion of the products are now used for this purpose, the term has become a misnomer.

Considered as a manufacture, the industry begins with the delivery of the crude resin at the distillery, but as the majority of the distillers own or lease the forests which supply the resin, it is found impossible to eliminate the capital and expenses pertaining to the care of these forests and the gathering of the resin so as to obtain statistics which relate exclusively to the operations of the distilleries. Hence the capital reported includes the total amount invested in the business; the employees comprise those engaged in all branches of the industry, including those employed in the forests; and the cost of materials consists of the amounts paid for barrels, casks, cooperage stock, cooperage, etc., and for resin and fuel purchased, if any. The cost of the crude turpentine gathered by distillers operating their own forests is included in the amounts paid as wages, miscellaneous expenses, etc.

The care of the forests, the species of trees from which resin is obtained, and the methods of tapping the trees and gathering the resin, are exhaustively

treated in the report of the division of forestry, Department of Agriculture, for 1892, and therefore will not be treated in this report.

In the early stages of the development of the industry, the crude resin was shipped to European and northern ports for distillation. "In the three years—1768 to 1770—88,111 barrels of crude turpentine, 20,646 barrels of pitch, and 88,366 barrels of tar were, on the average, annually exported to the mother country, representing a value of \$215,000 in our present currency."¹ While these figures indicate that the industry was of considerable importance prior to the Revolution, it was largely confined to the district lying between the Tar and Cape Fear rivers in North Carolina, within convenient access to the ports of Wilmington and Newbern, and consisted in gathering the resin and the destructive distillation of wood for the production of tar. Resin was distilled to some extent in northern cities; later, distilleries were operated in Wilmington and in the forests of North Carolina, thus enabling the operation to be carried on in connection with the gathering of the resin. The process was at first effected in clumsy iron retorts, but the introduction of the copper still in 1834 led to a largely increased yield of volatile oil, and the industry received a strong impetus.¹ The methods of distillation have not changed materially during the one hundred years' history of the industry in the United States. The object of the operation is to obtain the largest possible quantity of spirits of turpentine from a given quantity of resin. The quantity of spirits obtained depends largely upon the character of the crude turpentine and the skill of the distiller. The crude turpentine is composed of "dip," which is the gum in a liquid state, and of "scrape," which is the solidified resin scraped from the tree. The best quality is obtained during the first year the tree is worked, and is known as "virgin dip" or soft white gum; it is almost colorless and contains the largest quantity of volatile oil. In the following year the gum is of a deeper, yellowish color, the "yellow dip," and, with each succeeding year, it becomes darker in color, more viscid, and poorer in volatile oil.¹ The results of the distillation of a given quantity of crude turpentine, and a clear description of the method employed, are given in the following statement taken from the report of the division of forestry, Department of Agriculture, for 1892:

DISTILLATION.

"The process of distillation requires experience and care in order to prevent loss in spirits of turpentine, to obtain the largest quantities of rosin of higher grades, and to guard against overheating. After heating the still somewhat beyond the melting point of crude turpentine, a minute stream of tepid water from the top of the condensing tub is conducted into the still and

¹ Report of the Division of Forestry, Department of Agriculture, 1892.

allowed to run until the end of the process; this end is indicated by a peculiar noise of the boiling contents of the still and the diminished quantity of volatile oil in the distillate. On reaching this point the heating of the still and the influx of water have to be carefully regulated. After all the spirits of turpentine has distilled over, the fire is removed, and the contents of the still are drawn off by a tap at the bottom. This residuum, the molten rosin, is first allowed to run through a wire cloth, and is immediately strained again through coarse cotton cloth, or cotton batting made for the purpose, into a large trough, from which it is ladled into barrels. The legal standard weight of the commercial package is 280 pounds gross, no tare being allowed.

"The finest grades of rosin are largely used in the manufacture of paper, for sizing, of soaps, and of fine varnishes; the medium qualities are mostly consumed in the manufacture of yellow soap, sealing wax, in pharmacy, and for other minor purposes; and the lower and lowest qualities are used for pitch in ship and boat building, brewers' pitch, and for the distillation of rosin-oil, which largely enters into the manufacture of lubricating agents."

* * * * *

COST OF ESTABLISHMENT OF PLANT AND OF WORKING THE CROP.

"Lands, with the privilege of boxing the timber for the term of four years, are rented at the rate of \$50 per crop of 10,000 boxes (about 200 acres with 4,000 to 5,000 trees). The establishment of plant for the working of 20 crops requires an investment of about \$5,000, including the still, houses, sheds, tools, wagons, and working animals, mostly mules.

"The following statement, made by an operator of many years' experience, exhibits the actual expenses incurred for the working of one crop during four years; the work is for the greatest part done by the job:

Chopping 10,000 boxes	\$125. 00
Inspecting and tallying the same	15. 00
Cornering 10,000 boxes	12. 00
Raking around the trees, at \$10 per season	40. 00
Chipping boxes during 111 weeks, at \$5 per week	555. 00
Dipping crude resin, 650 barrels, and scraping 460 stands, at 30 cents	333. 00
Hauling dippings and scrapings, at 30 cents per barrel ..	333. 00
Distilling, at 20 cents per barrel	222. 00
Spirit barrels, 122, at \$2.80	305. 00
Making and filling 795 barrels resin, at 30 cents	238. 50
Superintendence of the crop	80. 00
Total working expense of one crop	2, 258. 50
Rent of land for one crop	50. 00
Cost of one crop	2, 308. 50
"Total expense of operating a plant of 20 crops during four years:	
Labor, rent, and materials	\$46, 170. 00
Interest on capital invested, \$5,000, at 6 per cent	1, 200. 00
Loss by depreciation of plant, 10 per cent per year for four years	2, 000. 00
Taxes and incidentals	630. 00
Total	50, 000. 00

"YIELD.—It appears that the yield of the crop of 200 acres distributes itself about as follows:

	Dip.	Scrapes.	Total crude turpentine.	Total yield, per cent.	Scrape, per cent.	SPIRITS.		Rosin.
						Gallons.	Per cent.	
First year	Lbs. 67,200	Lbs. 16,800	Lbs. 84,000	30.9	20.0	2,100	31.4	Bbls. 260
Second year	64,000	28,000	92,000	30.5	34.8	2,000	32.8	200
Third year	28,800	24,000	52,800	¹ 19.5	45.5	1,100	18.0	100
Fourth year	28,000	24,000	52,000	² 19.1	46.1	900	14.8	100
	178,000	98,600	271,600	100.0	³ 29.0	6,100	100.0	⁴ 669

¹ Evidently an error; should be 28,800. ⁴ Evidently an error; should be 46.2.
² Evidently an error; should be 19.4. ⁵ Evidently an error; should be 34.5.
³ Evidently an error; should be 19.2. ⁶ Evidently an error; should be 660.

"If we assume that 4,500 trees produce these amounts in four years, the yield per tree in crude turpentine is about 60 pounds. The result at the still would indicate that each tree furnishes between 1 1/4 and 1 1/2 gallons of spirits, and one-eighth of a barrel, or 30 pounds, of rosin of better grade, or at best 75 cents' worth of product during the four years, which has cost 55 cents to pro-

duce, leaving 5 cents net per tree per year, or from \$1 to \$1.25 per acre.

"From the fact that 4,000 acres of timber land (20 crops of 200 acres each) during four years' working produce 120,000 gallons of spirits of turpentine, or 7 1/2 gallons per acre and year, it follows that to produce the 17,000,000 gallons reported as the annual product not less than 2,250,000 acres must be in orchard; and since the yield of the first year represents 35 per cent of the total annual yield, at least 800,000 acres of virgin forest are newly invaded annually to supply the turpentine stills in operation."

Statistics of the industry were first presented in the reports of the census of 1850, but the manufacture of naval stores had become of considerable importance prior to 1850, the reports of the Treasury Department showing that large quantities of turpentine, rosin, and tar had been exported during each year from 1790 to that time. Table 2 shows the exports of spirits of turpentine, turpentine and rosin, and tar and pitch from 1850 to 1900, inclusive.

TABLE 2.—QUANTITIES AND VALUES OF SPIRITS OF TURPENTINE, TURPENTINE AND ROSIN, AND TAR AND PITCH EXPORTED EACH YEAR: 1850 TO 1900, INCLUSIVE.

YEAR.	SPIRITS OF TURPENTINE.		TURPENTINE AND ROSIN.		TAR AND PITCH.		YEAR.	SPIRITS OF TURPENTINE.		TURPENTINE AND ROSIN.		TAR AND PITCH.	
	Gallons.	Value.	Barrels.	Value.	Barrels.	Value.		Gallons.	Value.	Barrels.	Value.	Barrels.	Value.
1850.....	644,616	\$229,741	398,111	\$1,142,713	133,833	(1)	1876.....	5,178,934	\$1,672,068	824,256	\$2,188,623	69,138	\$164,647
1851.....	363,828	145,410	387,220	1,063,842	112,971	(1)	1877.....	6,796,927	2,274,639	900,056	2,384,378	72,189	160,410
1852.....	358,658	137,856	449,194	1,209,173	63,254	(1)	1878.....	7,638,568	3,333,569	1,042,183	2,329,319	73,407	158,094
1853.....	634,371	347,492	464,715	1,406,488	59,144	(1)	1879.....	7,575,556	2,045,673	1,112,810	2,159,141	52,350	101,445
1854.....	1,669,323	1,056,720	601,280	2,066,326	76,989	(1)	1880.....	7,091,200	2,132,154	1,040,346	2,368,180	41,221	84,728
1855.....	2,339,138	1,137,152	731,000	1,761,428	89,999	\$288,028	1881.....	6,595,528	2,414,719	1,023,710	2,529,423	46,582	109,381
1856.....	1,844,600	839,048	524,799	1,222,066	87,765	235,487	1882.....	8,136,493	3,798,034	1,156,012	3,240,803	50,516	129,554
1857.....	1,522,177	741,346	641,517	1,544,572	96,781	208,610	1883.....	9,867,344	4,366,229	1,347,256	3,068,132	72,269	174,686
1858.....	2,457,235	1,089,282	574,573	1,464,210	42,676	100,679	1884.....	11,300,729	3,885,500	2,568,470	3,027,916	243,544	291,284
1859.....	2,882,230	1,306,035	798,083	2,248,391	64,256	141,058	1885.....	8,987,226	2,690,231	1,285,482	2,228,114	237,572	266,449
1860.....	4,072,023	1,916,289	770,652	1,818,238	60,623	151,404	1886.....	8,217,678	2,811,777	1,144,857	2,196,090	219,068	236,208
1861.....	2,941,855	1,192,787	536,207	1,060,257	55,057	143,280	1887.....	10,209,883	3,489,895	2,137,257	2,330,908	220,471	239,772
1862.....	43,607	54,691	65,441	293,407	9,765	65,884	1888.....	10,585,942	3,580,106	2,153,017	2,310,018	220,306	239,783
1863.....	58,565	143,777	17,025	237,991	11,956	102,566	1889.....	9,681,769	3,777,525	2,143,573	2,146,388	222,028	241,938
1864.....	32,548	87,988	2,418	55,551	7,156	70,782	1890.....	11,248,920	4,590,931	2,619,704	2,279,410	228,806	256,105
1865.....	51,863	106,967	11,278	158,138	11,810	77,515	1891.....	12,248,621	4,668,140	2,179,372	2,348,379	217,265	230,094
1866.....	349,325	313,086	250,462	1,504,058	87,335	147,528	1892.....	13,176,470	4,500,721	2,195,953	2,346,795	222,377	252,417
1867.....	1,513,225	980,699	334,104	1,984,865	21,657	84,528	1893.....	18,415,459	3,893,436	2,068,333	2,353,621	220,042	240,244
1868.....	3,068,629	1,627,577	443,501	2,028,514	26,751	110,641	1894.....	12,618,407	3,437,245	2,000,753	2,315,967	217,290	237,736
1869.....	3,184,955	1,444,968	585,939	2,020,519	52,241	195,025	1895.....	14,652,738	3,998,277	2,187,759	2,379,823	222,773	241,673
1870.....	3,246,697	1,357,302	583,316	1,776,625	47,401	143,460	1896.....	17,431,566	4,618,811	2,191,254	2,419,707	216,865	234,046
1871.....	2,463,554	1,009,608	511,959	1,600,651	32,584	93,884	1897.....	17,302,823	4,447,551	2,248,036	2,473,529	217,640	234,878
1872.....	4,495,441	2,521,357	692,728	3,256,854	36,722	131,010	1898.....	18,351,140	5,380,806	2,225,428	2,377,863	219,316	236,475
1873.....	5,114,653	2,667,386	845,162	3,631,996	43,585	177,435	1899.....	17,761,533	6,100,419	2,586,174	2,379,634	236,903	236,002
1874.....	6,784,173	2,758,933	929,342	3,046,491	71,920	238,779	1900.....	18,090,582	8,554,922	2,389,364	2,842,190	236,585	277,082
1875.....	5,599,624	1,924,544	937,527	2,774,419	54,905	127,206							

¹ The value of tar and pitch is included in that of turpentine and rosin, 1850 to 1864, inclusive.
² The quantity and value of pitch, 1884-1900, inclusive, is included with turpentine and rosin, instead of with tar.

The statistics presented in Tables 1 and 2 indicate the prosperity or depression of the industry during the past fifty years. At the census of 1850, returns were received from 856 establishments, reporting a product valued at \$2,855,657. While reports were received from only 625 establishments at the census of 1860, showing a decrease of 231 as compared with 1850, the value of the product increased to \$6,468,369, or 126.5 per cent, and the number of gallons of spirits of turpentine exported increased from 644,616 to 4,072,023. The decrease in the industry during the decade from

1860 to 1870 was due primarily to the war, and was even greater than indicated by Table 1, as the values given for the census of 1870 are expressed in a currency which was at a discount as compared with gold, and should be reduced by about one-fifth for purposes of comparison with the values for prior and subsequent decades. With the exception of temporary depressions, the industry has steadily increased, until the number of establishments amounted, in 1900, to 1,503, with a product valued at \$20,344,888. The value of the exports of spirits of turpentine, rosin and crude tur-

pentine, and tar and pitch for 1900, amounted to \$12,474,194. During the decade ending with 1900, the exports of spirits of turpentine to foreign countries averaged 15,504,434 gallons annually, the greatest amount, 18,351,140 gallons, being reported for the year 1898.

Turpentine distilleries are frequently located in regions difficult of access, and operated by persons who are ignorant of business methods, keep no book accounts, and are disinclined to furnish statistical information. Under these conditions, it is difficult to gather authentic data. It is possible that these difficulties were greater at prior censuses, and that the industry has not increased during the past decade to the extent indicated by the figures in Table 1. At each census the general enumerators, while enumerating the population, have secured reports from the establish-

ments engaged in this industry. At the census of 1900 the work of the enumerators was supplemented by correspondence, schedules being mailed to all distillers from whom the enumerators failed to secure reports. It is, therefore, possible that the enumeration for 1900 is more complete than that for any prior census.

The rapid increase in the products was necessary to meet the urgent demand for spirits of turpentine and rosin in various fields of industry, such as the manufacture of paint, varnish, paper, soap, lubricants, pharmaceutical preparations, for illuminating purposes, and in the rubber industry. The depletion of the forests of North Carolina and South Carolina accelerated the development of the industry in other states.

Table 3 shows the distribution of the 1,503 establishments reported in 1900 throughout the South Atlantic and Eastern Gulf states.

TABLE 3.—SUMMARY BY STATES: 1900.

	United States.	Alabama.	Florida.	Georgia.	Louisiana.	Mississippi.	North Carolina.	South Carolina.
Number of establishments.....	1,503	152	366	524	10	145	174	182
Capital:								
Total.....	\$11,847,495	\$1,176,891	\$5,526,618	\$3,785,482	\$74,539	\$798,373	\$217,423	\$268,719
Land.....	\$5,622,040	\$526,973	\$3,206,099	\$1,496,829	\$34,550	\$227,977	\$55,615	\$94,997
Buildings.....	\$1,037,240	\$111,929	\$488,376	\$355,120	\$8,240	\$99,885	\$19,745	\$13,945
Machinery, tools, and implements.....	\$1,576,848	\$161,778	\$662,172	\$559,992	\$16,125	\$55,219	\$66,671	\$55,996
Cash and sundries.....	\$8,552,267	\$376,716	\$1,269,971	\$1,373,491	\$15,624	\$317,292	\$95,892	\$103,781
Salaried officials, clerks, etc., number.....	1,889	162	748	763	8	147	25	35
Salaries.....	\$778,694	\$67,062	\$306,851	\$320,265	\$3,490	\$67,775	\$5,460	\$8,291
Wage-earners, average number.....	41,864	5,716	15,073	19,199	302	2,288	400	386
Total wages.....	\$8,393,433	\$780,573	\$3,049,200	\$3,772,848	\$54,180	\$580,410	\$70,637	\$135,575
Men, 16 years and over.....	41,875	5,048	14,947	19,028	295	2,197	393	367
Wages.....	\$8,338,044	\$773,717	\$3,034,259	\$3,754,972	\$53,910	\$517,039	\$70,497	\$133,650
Women, 16 years and over.....	173	29	49	48	.....	48	1	18
Wages.....	\$21,630	\$2,877	\$3,977	\$5,803	.....	\$7,568	\$100	\$1,805
Children, under 16 years.....	316	44	93	122	7	43	1	1
Wages.....	\$38,809	\$3,979	\$10,964	\$12,573	\$270	\$5,803	\$100	\$120
Miscellaneous expenses.....	\$476,171	\$59,214	\$201,755	\$178,774	\$969	\$153,655	\$3,516	\$3,297
Cost of materials used.....	\$6,186,492	\$650,681	\$1,222,932	\$2,292,665	\$33,275	\$697,539	\$318,139	\$471,261
Value of products:								
Total.....	\$20,344,888	\$2,088,705	\$6,469,605	\$8,110,468	\$115,324	\$1,772,435	\$1,055,695	\$787,656
Spirits of turpentine—								
Number of barrels.....	754,670	74,078	236,778	305,791	4,904	64,267	39,833	20,569
Value.....	\$14,460,235	\$1,460,592	\$4,800,033	\$6,024,034	\$35,415	\$1,253,934	\$772,772	\$553,445
Rosin—								
Number of barrels.....	2,563,087	245,394	772,537	950,522	14,055	241,607	218,899	120,013
Value.....	\$5,129,238	\$490,832	\$1,639,472	\$2,055,550	\$27,319	\$461,165	\$271,352	\$138,528
Value of all other products.....	\$255,385	\$32,241	\$30,100	\$30,864	\$2,590	\$57,336	\$11,571	\$40,633

In 1850 the industry was largely confined to North Carolina, when 785, or 91.7 per cent of the establishments, with a product valued at \$2,476,252, or 86.7 per cent of the total product, were reported for that state. In 1856 the exports from the ports of Wilmington, Newbern, and Washington were 96,545 gallons of spirits of turpentine and 12,556 barrels of turpentine and rosin, 5.2 and 2.4 per cent, respectively, of the total exports of these products. The industry appears to have reached its highest point in this state about 1860, and since then has gradually decreased. In 1900 there were 174 establishments reported for the state, with products valued at \$1,055,695, or only 5.2 per cent of the total for the United States, while the exports of spirits of turpentine from the ports of the state had decreased to 53,974 gallons.

The industry does not appear to have reached as large proportions in South Carolina. There were 40 establishments, with a product valued at \$235,836, reported for the state at the census of 1850. The indus-

try increased until 1880, when 192 establishments were reported, with a product valued at \$1,893,206, which was the largest product reported for the state. In 1900 there were 132 establishments, with a product of \$787,656. The industry appears to have reached its largest proportions in the Carolinas about 1880, when 5,321,456 gallons of spirits of turpentine and 656,019 barrels of turpentine and rosin were exported from the ports of the two states.

The industry entered the forests of Georgia during the decade ending with 1850, and 364 barrels of turpentine and rosin were exported from the port of Savannah in 1856. The apparently unlimited resources of the forests of the state have furnished a rich field for the operations of the turpentine distillers, and the industry has been conducted with the intention of obtaining the greatest return for the immediate outlay, irrespective of the waste and wanton destruction of the forests. While the development and increase of the industry under these conditions have been rapid, the possibilities

of its continued prosperity are greatly lessened. There were 14 establishments reported for the state at the census of 1850, and the products were valued at \$55,068. As shown by Table 3, Georgia and Florida now rank first and second, respectively, in the number of establishments and value of products reported for the industry, Florida being first and Georgia second with respect to capital invested. There were 524 establishments reported for Georgia, or 34.9 per cent of the total number, and the products were valued at \$8,110,468, or 39.9 per cent of the total. There were 305,791 barrels of spirits of turpentine and 950,582 barrels of rosin produced in the state, or 40.5 and 37.1 per cent, respectively, of the totals for the United States. The growth of the industry in Florida, as indicated by the census statistics, has been most marked during the last decade. There were only 5 establishments reported for the state in 1850, with a product of \$29,671. There was a considerable increase in the value of product shown in 1860, 5 establishments reporting \$100,676. There were 2 establishments, with a product of \$26,116, reported for 1870, while 10 establishments were reported for 1880, with a product valued at \$295,500; 15 were returned for 1890, with a product of \$191,859, as compared with 366 in 1900, with a product valued at \$6,469,605. The number of establishments and value of products in 1900 formed 24.4 and 31.8 per cent, respectively, of the totals for the United States. The production of spirits of turpentine amounted to 236,778 barrels and that of rosin to 772,537 barrels, being 31.4 and 30.1 per cent, respectively, of the totals for the United States.

The first indication of the existence of the industry in the state of Alabama was at the census of 1850, when 4 establishments, with a product valued at \$17,800, were reported for the state. There were 152 establishments reported for 1900, with a product valued at \$2,033,705.

The products of Mississippi and Louisiana are largely marketed through the port of New Orleans. Statistics of the exports of the United States by districts are not available prior to 1856; in that year 10,511 gallons of spirits of turpentine were exported from the port of New Orleans. At the census of 1850 there were 5 establishments, with a product valued at \$19,680, reported for Mississippi, and 1 establishment, with a product of \$1,750, for Louisiana, and in 1900, for the former state, 145 establishments manufacturing a product valued at \$1,772,435 were reported, and for the latter, 10 establishments with a product of \$115,324 in value.

Until recent years the products of the industry were sent almost exclusively to the nearest seaport, and from there shipped to northern cities or foreign countries. Therefore, the exports from the ports of the different states are a fair indication of the extent of the industry in those states, or in the regions surrounding the ports, which, in some cases, embrace parts of adjoining states. Table 4 shows the total quantity of spirits of turpentine, turpentine and rosin, and tar and pitch exported from the ports of each state in each decennial year from 1860 to 1900, inclusive.

TABLE 4.—EXPORTS OF SPIRITS OF TURPENTINE, TURPENTINE AND ROSIN, AND TAR AND PITCH BY DECENNIAL YEARS: 1860 TO 1900.

STATE AND PORT. ¹	1900			1890			1880			1870			1860		
	Spirits of turpentine.	Turpentine, rosin, and pitch.	Tar.	Spirits of turpentine.	Turpentine, rosin, and pitch.	Tar.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.
	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.
United States.....	18,090,582	2,389,364	86,585	11,248,920	1,619,704	23,806	7,091,200	1,040,345	41,221	3,246,697	583,316	47,401	4,072,023	770,652	60,623
Alabama.....	158,018	58,646	113	210		7		22,373	154	462	885	104		500	
Mobile.....	158,018	58,646	113	210		7		22,373	154	462	885	104		500	
Alaska.....		7													
Arizona.....			24												
California.....	45	585	483		25	71	6,055	125	294	1,965	76	112	1,280	2	106
San Diego.....	45		1		25	1									106
San Francisco.....		583	482			70	6,055	125	294	1,965	76	112	1,280	2	
Connecticut.....														640	10
Middletown.....															10
New Haven.....														500	174
New London.....														140	16
Delaware.....								1,375							
Florida.....	795,267	243,452	10	1,742	940	59	25,728	12,215	284	90	518	85			
Apalachicola.....	30,755	52,705		50											
Fernandina.....	167,708	14,498	5				25,536	3,189							
Key West.....				1,134	855	54	192	611	194						
Pensacola.....	476,167	169,281		460	66			7,067		90	168	85			
St. Johns.....	166	20	5	98	19	5		1,348	40		277				
St. Marks.....											43				
Tampa.....	130,421	6,888													
Georgia.....	14,623,328	1,408,928	2	7,251,929	841,217	40	570,549	91,909	111		519	29	137	134	34
Brunswick.....	3,173,410	339,019	2	1,699,447	174,104	40	131,600	11,314	80						
Savannah.....	11,449,918	1,079,909		5,552,482	669,113		438,949	80,095	31		519	29	137	134	34
Louisiana.....	212,031	47,890	379	599	1,128	126	276	5,089	110	7,558	8,423	241	11,197	18,909	800
New Orleans.....	212,031	47,890	379	599	1,128	126	276	5,089	110	7,558	8,423	241	11,197	18,909	800

¹The names of the ports are as they appear in the reports of the Bureau of Statistics of the United States Treasury Department.

TABLE 4.—EXPORTS OF SPIRITS OF TURPENTINE, TURPENTINE AND ROSIN, AND TAR AND PITCH, BY DECENNIAL YEARS: 1860 TO 1900—Continued.

STATE AND PORT. ¹	1900			1890			1880			1870			1860		
	Spirits of turpentine.	Turpentine, rosin and pitch.	Tar.	Spirits of turpentine.	Turpentine, rosin and pitch.	Tar.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.
	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.
Maine	84,103	831	3	4,062	79	2	90	528						160	931
Bangor	84,103	56	1							41				5	
Belfast							90			40					
Passamaquoddy		775		4,062	75					1				35	
Portland and Fal-mouth			2		4	2		528						120	931
Maryland	111	174,416	7	3,002	50,928	127	754	7,623	201	6,104	30,626	760	38,080	20,268	2,047
Baltimore	111	174,416	7	3,002	50,928	127	754	7,623	201	6,104	30,626	760	38,080	20,268	2,047
Massachusetts	2,044	18,359	1,641	29,418	7,088	1,447	50,915	3,612	6,060	52,511	11,435	6,292	123,163	16,605	13,027
Boston	2,044	18,357	1,637	29,418	7,087	1,448	50,915	3,577	6,056	52,011	10,134	6,252	122,970	15,640	12,763
Fall River															5
Gloucester															4
New Bedford			2			4			35	500	10	30	45	10	15
Salem										1,291	80	10	148	955	240
Michigan	307,716	3,879	225	5,434	1,939		7,639	103	54						
Detroit	25,363	3,439	173	5,434	1,939		7,639	103	54						
Huron	282,353	440	52												
Minnesota			5	7,053	5	85	362	17	7				1	1	
Duluth			5												
Minnesota				7,053	5	85	362	17	7				1	1	
Mississippi			2						10	10					
Pearl River			2						10	10					
Montana and Idaho	11														
New Jersey															13
Camden															13
New York	1,630,164	252,801	9,738	894,287	267,801	7,995	1,105,100	227,746	20,572	796,824	464,538	31,072	2,816,768	562,253	30,301
Buffalo Creek	15,426	4,599								741			905	41	261
Cape Vincent		14		770		25	2,050	3	204					316	
Champlain	27,728	15,830	1,606	32,425	12,289	265	101,224	10,390	8,517	69,960	4,377	4,006		4,815	
Genesee		2												31	
New York	1,587,010	231,322	8,002	861,092	254,394	7,705	1,001,826	210,780	10,820	724,764	455,688	25,694	2,800,553	555,360	29,739
Niagara													12,740	609	12
Oswegatchie		1,034	130		1,148					300			160	15	
Oswego								6,573	1,031	1,800	4,473	540	2,379	1,097	239
North Carolina	53,974	139,767	17,404	1,751,270	304,100	18,690	3,630,009	497,456	11,602	2,042,756	33,212	7,677	736,948	77,851	6,264
Edenton															20
Newbern													1,815	5	391
Pamlico			4		115	108	906	99	130	1,025	25	358			
Plymouth															101
Washington													1,293	80	192
Wilmington	53,974	139,768	17,400	1,751,270	303,985	18,584	3,629,103	497,357	11,472	2,041,731	33,187	7,319	733,840	77,736	5,560
North and South Dakota	39,649	1,774	840												
Ohio	40								8						
Cuyahoga	40								8						
Sandusky															
Oregon				650											
Willamette				650											
Pennsylvania	121	144	35	500	1,201	47	1,443	7,974	1,807	544	3,063	142	25,511	19,845	347
Philadelphia	121	144	35	500	1,201	47	1,443	7,974	1,807	544	3,063	142	25,511	19,845	347
Rhode Island														200	534
Bristol															30
Newport															74
Providence													200	460	118
South Carolina		21,248		1,293,389	140,899	83	1,691,447	153,563		337,530	25,279	30	315,099	50,753	264
Beaufort													9,481	1,649	60
Charleston		21,248		1,293,389	140,899	8	1,691,447	153,563		337,490	25,267	30	305,613	49,104	204
Georgetown						75				40	12				
Texas	659	126	240	1,515	412	14	762	42		273	318	2			
Brazos de Santiago	90	87		580	27		742	40		240	311	2			
Corpus Christi		29	240	865	135	4	20	2							
Galveston	2				250	10									
Paso del Norte													23		
Saluria															
Texas	567			70									10		
Vermont	235,776	15,831	4,750				41				2				80
Memphremagog	9,768	2,307	2,774												
Vermont	226,008	13,524	1,976				41				2				80
Virginia			499		2,491		30	3,585		80	4,347	1,808	3,000	2,748	6,144
Norfolk and Ports-mouth															
Richmond			499		2,491			3,585		80	4,087	808	3,000	1,633	6,144
Washington	2,525	923	135	3,860											
Puget Sound	2,525	923	135	3,860											
Wisconsin						1									
Superior						1									

¹ The names of the ports are as they appear in the reports of the Bureau of Statistics of the United States Treasury Department.

Considerable quantities of these products are now shipped from the distilleries by rail to Northern and Western states, and also by the same method from the ports of receipt named in the above table. For this reason, the exports do not indicate the extent of the commercial interests of the several ports represented by these products. The boards of trade, produce exchanges, and other quasi-governmental organizations in the cities have, however, made a practice of compil-

ing statistics of receipts at the ports, and the statistics given in Table 5 have been obtained from these sources.

As shown by Table 3, the total product of spirits of turpentine in the United States during the year 1900 amounted to 754,670 barrels. From Table 5 it appears that 461,227 barrels were received for distribution at the principal ports during that year. These figures therefore indicate that 293,443 barrels were shipped directly from the distilleries to internal points of con-

TABLE 5.—SPIRITS OF TURPENTINE AND ROSIN RECEIPTS AT PORTS.

YEAR.	TOTAL.		WILMINGTON, N. C.		CHARLESTON, S. C.		SAVANNAH, GA.	
	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.
	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>
1896.....	455,380	1,768,484	46,563	205,137	10,871	70,240	308,867	1,143,026
1897.....	494,374	2,048,512	39,928	192,640	7,702	52,478	329,445	1,811,050
1898.....	464,086	1,760,866	35,273	163,459	3,724	35,597	313,797	1,127,130
1899.....	483,279	1,766,374	27,981	161,161	2,513	23,085	329,406	1,123,942
1900.....	461,227	1,765,229	29,761	167,316	1,851	25,919	309,405	1,076,815
1901.....	493,285	1,755,700	25,541	181,743	2,433	17,681	337,452	1,119,957

YEAR.	BRUNSWICK, GA.		MOBILE, ALA.		NEW ORLEANS, LA.		CARRABELLE, FLA.	
	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.
	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>
1896.....	56,538	215,544	20,314	57,745	12,160	56,348	5,067	15,444
1897.....	66,799	287,416	125,000	1,100,000	15,013	67,598	10,432	27,330
1898.....	65,161	250,182	13,700	50,200	16,605	69,049	15,828	62,279
1899.....	72,833	257,749	19,004	65,271	17,230	63,772	19,192	66,394
1900.....	69,489	240,584	13,964	47,306	20,954	91,255	15,743	55,635
1901.....	71,755	221,767	25,445	68,361	19,263	83,583	16,391	62,613

¹ Estimated.

sumption. The boards of trade of Cincinnati and St. Louis, respectively, report receipts of 52,387 and 18,000 barrels of spirits of turpentine, making a total of 70,387 barrels; but as many points of receipt have no available records, it is impossible to make satisfactory compilations.

The capital invested in the industry in 1900 amounted to \$11,847,495. Table 3 shows that this amount consisted of land valued at \$5,622,040; buildings valued at \$1,097,240; machinery, tools, and implements valued at \$1,575,948; and cash on hand, bills receivable, unsettled ledger accounts, and miscellaneous items of live capital amounting to \$3,552,267. In many instances the land is not owned by the distillers, but is leased for a crop, which generally extends over a period of three or four years. The amount reported for value of land is the land which was owned by the distillers, and includes not only the land on which the still was located, but the forests from which the crude material was obtained. From Table 7 it appears that \$18,714 was paid for rent of works, which represents the yearly expense for the use of the forests. Considered strictly as a manufacturing industry, the amount invested in forest lands should be deducted from the total capital, leaving \$6,225,455 as the amount of capital engaged in manufactures, as compared with a product valued at \$20,344,888.

In some instances the conditions under which the turpentine industry is conducted are anomalous. For instance: The distillers, in many cases, are advanced

money by factors or commission merchants, with which to carry on their operations for a year, the prospective crop being mortgaged to secure the payment of the advances, the factor controlling the output. Under these conditions the amount of live capital (cash on hand, bills receivable, unsettled ledger accounts, etc.) was abnormally large, including, as it did, the borrowed cash and the amounts represented by bills receivable for products shipped to the commission merchants. It formed 30 per cent of the total capital reported for the industry.

As previously explained, the amount, \$6,186,492, reported as the cost of materials used, does not include the value of the crude turpentine gathered by distillers, but represents only the amounts actually purchased. Using as a basis the reports for establishments that purchase crude turpentine, the office has estimated the total quantity of crude turpentine gathered, and Table 6 presents the total quantity gathered in each state, the quantities and values of the different classes of products, and the average values per barrel of spirits of turpentine and rosin.

From Table 6 it appears that the total value of products, \$20,344,888, consists of \$14,960,235, the value of 754,670 barrels of spirits of turpentine; \$5,129,268, the value of 2,563,087 barrels of rosin; and \$255,385, the value of the miscellaneous products, such as tar, pitch, rosin oil, charcoal, refined tar, etc. There were 4,033,161 barrels of crude turpentine consumed by the

TABLE 6.—QUANTITY OF CRUDE TURPENTINE GATHERED, QUANTITIES AND VALUES OF PRODUCTS, AND AVERAGE VALUES PER BARREL OF SPIRITS OF TURPENTINE AND ROSIN, BY STATES: 1900.

STATES.	Crude turpentine gathered.	PRODUCTS.							
		Total value.	Spirits of turpentine.			Rosin.			All other products, value.
			Quantity.	Value.	Average value per barrel.	Quantity.	Value.	Average value per barrel.	
United States.....	Barrels. 4,033,161	\$20,344,888	Barrels. 764,670	\$14,960,235	\$19.82	Barrels. 2,563,087	\$5,129,268	\$2.00	\$255,385
Alabama.....	373,005	2,083,705	74,078	1,460,582	19.72	245,394	490,882	2.00	82,241
Florida.....	1,212,935	6,469,605	289,778	4,800,035	20.27	772,537	1,639,472	2.12	30,100
Georgia.....	1,515,509	8,110,468	305,791	6,024,054	19.70	950,532	2,055,550	2.16	30,864
Louisiana.....	20,299	115,324	4,304	85,415	19.85	14,055	27,319	1.94	2,590
Mississippi.....	359,529	1,772,435	64,267	1,258,934	19.51	241,607	461,165	1.91	57,336
North Carolina.....	361,729	1,055,695	39,833	772,772	19.37	218,899	271,352	1.24	11,571
South Carolina.....	190,095	787,666	29,569	568,445	19.06	120,013	183,628	1.53	40,633

1,503 establishments reported. From the distillation of the 4,033,161 casks of crude turpentine, resulted 24.4 per cent of spirits of turpentine, 54.5 per cent of rosin, and 21.1 per cent of other products. In obtaining the above percentages, the crude turpentine, rosin, and spirits of turpentine were reduced to pounds, the reduction being based, in the case of crude turpentine and rosin, on the standard weights of the packages, and, in the case of spirits, on the generally accepted specific gravity of the oil.

The totals for all classes of establishments were used, those operating on "virgin dip" as well as those obtaining the raw material in the second, third, or even later years of the period during which the forests were worked. The purity of the crude turpentine, its freedom from "scrape" dirt, sticks, and leaves, and the skill of the operator are the principal factors in the production of a large percentage of spirits. The percentage of waste depends very largely on the care with which the molten rosin is strained. If the rosin is passed through a cloth or fine screen and all "dross" carefully removed, the percentage of waste will be increased.

The following is a statement of the quantities of spirits of turpentine and rosin manufactured during 1900, showing the exports and the domestic consumption:

	Spirits of turpentine.	Rosin.
	Gallons.	Barrels.
Domestic production.....	88,488,170	2,563,087
Exports.....	18,090,582	2,369,118
Domestic consumption.....	20,397,588	193,969

According to this statement, the consumption of spirits of turpentine in the United States is 20,397,588 gallons, or 53 per cent of the quantity manufactured; and of rosin, 193,969 barrels, or only 7.6 per cent of the entire output of the stills.

The imports of the above products are so small as hardly to deserve consideration, there being only 22,183 gallons of spirits and no rosin imported. In the statement the domestic production is reduced to gallons by multiplying by 51, which is generally accepted as the average number of gallons to a barrel.

The statistics for the census of 1900 are presented in detail for each state in Table 7. The highest proportion of spirits and the lowest proportion of waste are reported for the state of Louisiana. It is possible that the distillers in that state obtained a quantity of "virgin dip" during the census year. The lowest proportion of spirits and the highest proportion of waste are reported for North Carolina, where the industry is oldest and the percentage of "virgin dip" is, therefore, small.

Considering the proportions shown in Table 6 in connection with the percentages presented in the statement on page 4, it must be remembered that the figures on which the latter statement is based were obtained from representative establishments, and therefore can not be accepted as indicating the results of the operations of all the distillers in the United States. It is probable that the majority of the distillers are now engaged in working their forests during the second and third years. Therefore, the general percentage of spirits of turpentine would be about as shown for the "third year" in the statement on page 4.

TURPENTINE AND ROSIN.

1011

TABLE 7.—TURPENTINE AND ROSIN, BY STATES: 1900.

	United States.	Alabama.	Florida.	Georgia.	Louisiana.	Mississippi.	North Carolina.	South Carolina.
Number of establishments	1,563	152	366	524	10	145	174	132
Character of organization:								
Individual	713	67	123	232	2	64	140	85
Firm and limited partnership	726	79	230	272	7	63	33	42
Incorporated company	62	5	13	20	1	17	1	5
Miscellaneous	2	1				1		
Capital:								
Total	\$11,547,495	\$1,176,391	\$5,526,618	\$3,785,432	\$74,539	\$798,373	\$217,423	\$288,719
Land	\$5,622,040	\$525,973	\$3,206,099	\$1,496,329	\$34,550	\$227,977	\$35,615	\$94,997
Buildings	\$1,097,240	\$111,929	\$488,376	\$355,120	\$8,240	\$99,885	\$19,745	\$13,945
Machinery, tools, and implements	\$1,575,948	\$161,773	\$562,172	\$559,992	\$16,125	\$153,219	\$66,671	\$55,996
Cash and sundries	\$3,552,267	\$376,716	\$1,209,971	\$1,373,491	\$15,624	\$317,292	\$95,392	\$103,781
Proprietors and firm members	2,192	236	552	815	15	198	205	171
Salaried officials, clerks, etc.:								
Total number	1,889	162	748	763	8	147	25	36
Total salaries	\$778,694	\$67,062	\$306,351	\$320,265	\$3,490	\$67,775	\$5,460	\$8,291
Officers of corporations—								
Number	28	4	7	6		8	2	1
Salaries	\$22,620	\$2,300	\$8,000	\$4,020		\$7,100	\$600	\$600
General superintendents, clerks, etc.—								
Total number	1,861	158	741	757	8	139	23	35
Total salaries	\$756,074	\$64,762	\$298,351	\$316,245	\$3,490	\$60,675	\$4,860	\$7,691
Men—								
Number	1,856	157	738	756	8	139	23	35
Salaries	\$754,812	\$64,690	\$297,451	\$315,955	\$3,490	\$60,675	\$4,860	\$7,691
Women—								
Number	6	1	3	1				
Salaries	\$1,262	\$72	\$900	\$290				
Wage-earners, including pieceworkers, and total wages:								
Greatest number employed at any one time during the year	55,568	5,264	20,848	23,459	371	3,727	589	1,310
Least number employed at any one time during the year	39,942	3,525	14,718	17,959	252	2,204	368	916
Average number	41,864	3,716	15,673	19,199	302	2,288	400	886
Wages	\$8,393,483	\$780,578	\$3,049,200	\$3,772,548	\$54,180	\$580,410	\$70,697	\$135,575
Men, 16 years and over—								
Average number	41,375	3,643	14,947	19,028	295	2,197	398	867
Wages	\$8,338,044	\$778,717	\$3,084,259	\$3,754,972	\$53,910	\$517,039	\$70,497	\$138,650
Women, 16 years and over—								
Average number	173	29	28	49		48	1	18
Wages	\$21,630	\$2,877	\$3,977	\$5,303		\$7,568	\$100	\$1,805
Children, under 16 years—								
Average number	316	44	98	122	7	43	1	1
Wages	\$33,809	\$3,979	\$10,964	\$12,573	\$270	\$5,303	\$100	\$120
Average number of wage-earners, including pieceworkers, employed during each month:								
Men, 16 years and over—								
January	42,210	3,840	16,039	19,052	303	1,900	269	747
February	43,103	3,994	16,478	19,133	321	2,166	261	765
March	46,487	4,265	17,204	20,748	331	2,672	357	910
April	45,818	4,185	16,600	20,855	314	2,819	442	1,043
May	46,102	4,157	16,618	20,550	326	2,843	495	1,107
June	42,190	4,245	14,290	19,548	317	2,250	514	1,023
July	38,984	3,268	12,925	18,920	294	2,118	501	959
August	38,748	3,294	13,010	18,645	277	2,118	490	919
September	38,674	3,215	13,255	18,488	262	2,104	458	892
October	38,812	3,205	13,675	18,371	285	2,015	425	836
November	37,217	3,017	14,164	17,158	264	1,679	320	615
December	38,156	3,027	15,058	17,358	254	1,685	241	588
Women, 16 years and over—								
January	224	20	32	81		47	1	43
February	173	20	34	57		46		16
March	169	23	34	46		48	2	16
April	189	50	27	44		50	2	16
May	188	50	27	44		49	2	16
June	174	34	27	43		52	2	16
July	171	34	23	45		51	2	16
August	166	34	24	39		51	2	16
September	164	30	24	45		49		16
October	144	17	24	39		48		16
November	150	20	26	52		45		16
December	153	20	29	47		41		16
Children, under 16 years—								
January	344	56	89	152	5	37		5
February	335	53	100	134	5	38		5
March	337	56	97	125	5	49		5
April	371	78	103	129	8	52	1	
May	373	76	107	131	8	55	1	
June	319	34	96	123	8	52	1	
July	282	27	83	119	8	44	1	
August	282	31	83	115	8	39	1	
September	284	30	101	105	8	39	1	
October	285	30	99	109	8	39		
November	280	26	106	104	5	39		
December	295	31	109	114	5	36		
Miscellaneous expenses:								
Total	\$476,171	\$59,214	\$201,756	\$178,774	\$959	\$18,655	\$8,516	\$8,297
Rent of works	\$18,714	\$8,015	\$2,593	\$1,998		\$1,017	\$2,881	\$2,210
Taxes, not including internal revenue	\$30,918	\$8,157	\$38,946	\$26,714	\$424	\$4,178	\$1,110	\$1,389
Rent of offices, insurance, interest, and all sundry expenses not hitherto included	\$216,230	\$24,616	\$82,911	\$86,681	\$235	\$13,249	\$4,465	\$4,073
Contract work	\$160,309	\$18,426	\$77,306	\$63,381	\$300	\$211	\$60	\$625
Cost of materials used:								
Total	\$6,186,492	\$650,681	\$1,222,982	\$2,202,665	\$33,275	\$697,539	\$318,139	\$471,261
Crude turpentine purchased	\$4,542,383	\$475,953	\$671,371	\$1,673,995	\$22,026	\$573,579	\$719,907	\$405,552
Fuel	\$88,604	\$11,512	\$22,522	\$25,133	\$2,364	\$13,955	\$7,206	\$6,792
Mill supplies	\$8,008	\$1,006	\$4,178	\$2,537	\$1	\$1,657	\$65	\$6
All other materials	\$1,486,630	\$143,659	\$503,764	\$576,658	\$7,869	\$107,921	\$69,673	\$57,586
Freight	\$60,867	\$18,491	\$21,097	\$14,342	\$1,525	\$2,799	\$1,288	\$1,325

MANUFACTURES.

TABLE 7.—TURPENTINE AND ROSIN, BY STATES: 1900—Continued.

	United States.	Alabama.	Florida.	Georgia.	Louisiana.	Mississippi.	North Carolina.	South Carolina.
Products:								
Total value.....	\$20,344,888	\$2,033,705	\$6,469,605	\$8,110,468	\$115,824	\$1,772,435	\$1,055,695	\$787,656
Spirits of turpentine—								
Number of barrels.....	754,670	74,078	286,778	305,791	4,304	64,267	39,883	29,509
Value.....	\$14,960,235	\$1,460,582	\$4,800,033	\$6,024,054	\$85,415	\$1,253,934	772,772	\$563,445
Rosin—								
Number of barrels.....	2,563,087	245,394	772,537	950,582	14,055	241,607	218,899	120,013
Value.....	\$5,129,268	\$490,882	\$1,639,472	\$2,055,550	\$27,319	\$461,165	\$271,352	\$183,528
Value of all other products.....	\$255,385	\$82,241	\$30,100	\$30,864	\$2,590	\$57,336	\$11,571	\$40,083
Comparison of products:								
Number of establishments reporting for both years.....	597	53	113	219	2	47	84	79
Value for census year.....	\$9,198,442	\$923,578	\$2,707,719	\$3,899,129	\$15,800	\$593,977	\$540,446	\$517,703
Value for preceding business year.....	\$7,813,259	\$842,027	\$2,217,754	\$3,310,503	\$13,900	\$500,130	\$500,303	\$423,642
Power:								
Number of establishments reporting.....	135	6	63	62	1	1	2	.....
Total horsepower.....	866	50	350	422	5	10	29	.....
Engines, steam—								
Number.....	116	7	50	54	2	1	2	.....
Horsepower.....	706	50	219	393	5	10	29	.....
Other power—								
Number.....	28	.....	21	7	.....	.....	.....	.....
Horsepower.....	160	.....	131	29	.....	.....	.....	.....
Establishments classified by number of persons employed, not including proprietors and firm members:								
Total number of establishments.....	1,503	152	366	524	10	145	174	132
No employees.....	16	1	.....	.....	.....	2	11	2
Under 5.....	272	13	5	15	1	39	136	63
5 to 20.....	253	37	35	73	1	37	21	49
21 to 50.....	533	67	132	262	6	45	6	15
51 to 100.....	347	27	157	138	2	20	.....	3
101 to 250.....	79	7	34	36	.....	2	.....	.....
251 to 500.....	3	.....	3	.....	.....	.....	.....	.....

PAPER AND PULP.

(1018)

PAPER AND PULP.

By CHARLES W. RANTOUL, Jr., *Expert Special Agent.*

The manufactures of paper and wood pulp have become so closely connected that they are now treated as a single industry. At former censuses the statistics for wood pulp were reported separately, but the schedule of inquiry for the Twelfth Census was so prepared as

to apply to paper mills, pulp mills, and paper and pulp when manufactured at the same mill.

Table 1 shows the totals for the combined industries at the censuses of 1850 to 1900, inclusive, with the percentages of increase for each decade.

TABLE 1.—COMPARATIVE SUMMARY FOR THE UNITED STATES, 1850 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	DATE OF CENSUS.						PER CENT OF INCREASE.				
	1850	1860	1870	1880	1890	1900	1850 to 1860	1860 to 1870	1870 to 1880	1880 to 1890	1890 to 1900
Number of establishments	443	555	677	742	649	763	17.6	112.5	9.6	22.0	25.3
Capital	\$7,260,864	\$14,052,683	\$34,556,014	\$48,139,652	\$89,829,548	\$167,507,713	86.6	86.6	39.3	145.9	93.5
Salaries	117.7	(³)	(^{3})	(^{3})	(^{3})	(^{3})	154.2	.....	.....	.....	.....
Salaried officials, clerks, etc., number	6,785	10,911	18,021	25,631	31,050	49,646	59.9	21.1	42.2	65.2	60.8
Wage-carriers, average number	2,950	4,392	6,153	7,648	6,767	7,930	17.2	111.5	24.3	40.1	48.9
Total wages	\$1,497,792	\$2,767,212	\$7,208,691	\$8,970,133	\$13,204,828	\$20,746,426	57.1	47.2	24.4	160.5	84.8
Men, 16 years and over	6,519	11,032	17,317	24,015	41,547	41,547	73.0	38.7	57.0	69.2	70.0
Wages	(³)	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	63.6	.....	.....	.....	.....	
Women, 16 years and over	2,950	(³)	(^{3})	(^{3})	(^{3})	(^{3})	14.8	.....	.....	.....	.....
Wages .....	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(³)	136.9	159.8	120.3	.....	.....			
Children, under 16 years	(³)	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	113.1	.....	.....	.....	.....	
Wages .....	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(³)	50.4	.....	.....	.....	.....	
Miscellaneous expenses	\$5,553,929	\$11,062,260	\$30,058,563	\$34,862,132	\$44,228,480	\$70,530,236	59.5	26.9	16.0	159.1	108.9
Cost of materials used	\$10,187,177	\$21,216,802	\$48,849,285	\$57,366,860	\$78,987,184	\$127,326,162	61.3	37.6	17.4	130.2	108.3
Value of products .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Decrease.

² Includes proprietors and firm members, with their salaries; number only reported in 1900, but not included in this table. (See Table 7.)

³ Not reported separately.

⁴ Not reported.

In preparing Table 1 a combination was made of the statistics of paper and of wood pulp, which were formerly reported separately. The statistics for 1850 and 1860 include the manufacture of paper only. The manufacture of wood pulp was first reported at the census of 1870, and appears as a separate industry in that and the two following censuses. In 1900 the manufactures of paper and of wood pulp were considered as forming a single industry, and their statistics were reported together. The term "establishment" as used in the tables of this report is defined as representing a mill or mills owned by one individual, firm, or corporation, when located in the same city or county. Mills situated in different cities, counties, or states are treated as separate establishments, even though under the same ownership.

It appears from Table 1 that since 1850 the number of establishments for the combined industry has in-

creased from 443 to 763; the number of wage-carriers from 6,785 to 49,646; the wages paid from \$1,497,792 to \$20,746,426; and the value of products from \$10,187,177 to \$127,326,162.

During the decade from 1890 to 1900, which in many respects has been the most important in the history of the industry, the capital invested shows an increase from \$89,829,548 to \$167,507,713, or 86.5 per cent. This represents the value of land, buildings, machinery, tools, and implements, and cash and sundries utilized in the business, but does not include the capital stock of any of the corporations. In the same period the number of establishments increased from 649 to 763, or only 17.6 per cent. The large increase in capital was due to a greater extent to the improvement and development of plants already in existence than to the erection of additional mills by new capital. This increase in the size and value of individual establishments is notice-

able throughout these figures, not only in the capitalization, but in the volume of the transactions of each concern as shown in the tables of production.

Table 1 shows that in 1850 the average amount of capital employed in each establishment was \$16,390; in 1860 it was \$25,320; in 1870, \$51,043; in 1880, \$64,878; in 1890, \$138,412; and in 1900 it was \$219,538. The average capital per establishment was more than thirteen times as great in 1900 as in 1850. These figures illustrate the modern tendency to concentration of industry in large establishments. Under the stress of competition the producer endeavors to realize the advantages in economy and efficiency of production on a large scale.

The average number of wage-earners reported for 1900 was 49,646, an increase of 59.9 per cent over the 31,050 reported for 1890. The total wages paid increased from \$13,204,828 to \$20,746,426, or 57.1 per cent.

In 1900 the amount paid for miscellaneous expenses was \$10,184,106, an increase of 50.4 per cent over the \$6,770,681 paid in 1890. This item includes rent, taxes, interest, insurance, contract work, and all other sundry expenses. The cost of materials was \$44,228,480 in 1890; in 1900 it had increased 59.5 per cent, to \$70,530,236. In value of products an increase of 61.3 per cent is noted, from \$78,937,184 to \$127,326,162.

In addition to the 763 active establishments during the census year, with a capital of \$167,507,713, shown in Table 1, there were 29 idle establishments, with a capital of \$4,326,629, divided as follows:

STATES.	Number of idle establishments.	Capital.
California	2	\$452,000
Colorado	1	1,575,000
Connecticut	2	60,000
District of Columbia	1	200,000
Florida	1	40,000
Illinois	2	199,396
Indiana	1	38,000
Iowa	1	30,000
Maryland	2	38,000
Massachusetts	3	734,908
Michigan	2	31,307
New Jersey	2	46,852
New York	3	47,500
Ohio	2	259,666
Pennsylvania	2	154,000
Vermont	1	15,000
Wisconsin	1	400,000

The above figures do not include any plants absolutely abandoned, but only such as were not running through some temporary necessity of closing down, or such as it was reasonable to suppose might at some later date be engaged in the manufacture of paper or pulp; nor do they include several large plants in course of construction that had never been in operation up to the close of the census year. Among these latter are the large plants of the Great Northern Paper Company, at Millinocket, Me., and of the St. Regis Paper Company, at Watertown, N. Y.

There is a great diversity among the different paper and pulp establishments as to materials used, processes

employed, kinds of products, and quantity of output. Some plants consume but a limited variety of materials, others use nearly all the different kinds enumerated. Some make but a few thousand pounds of paper or pulp a day, others hundreds of tons; while the products range in quality from tissue paper to trunk board, and from news to high-grade ledger papers, in value from less than twenty to several hundred dollars per ton.

Table 2 shows the quantity and cost of the different varieties of materials and the number of establishments using each in 1900.

Table 3 shows the quantity and value of the different kinds of products and the number of establishments producing each in 1900.

In Tables 2 and 3 the number of establishments shown for each item is the whole number reporting the material or product of the kind specified; but in Table 2 the number shown as using fiber falls short of the whole number actually using this material, for only those purchasing and not those making it for their own use are so shown. So in Table 3, where pulp or fiber was made and all consumed by the same establishment, its value is not shown. Single mills, moreover, frequently use different kinds of materials, employ various processes, and make several classes of products, so that in these tables the sum of the numbers of establishments reporting the different items is greater than the number of mills shown for the whole industry.

The tendency to combine different stages in the general process of production, which made it impossible for the Twelfth Census to treat paper and pulp manufacture as separate industries, is brought out clearly in these tables. Of the 586,374 tons of ground wood pulp produced, 306,322 tons, or 52.2 per cent, were made for use in the establishments producing it; of 177,124 tons of soda fiber, 78,110 tons, or 44.1 per cent, and of 416,037 tons of sulphite fiber, 144,452, or 34.7 per cent, were likewise made for the use of the producing establishments.

On the other hand, although there appears to be a tendency for the establishments using wood fiber to make this material themselves, and for those manufacturing wood pulp to continue its manipulation until the finished product, paper, is reached, yet there also seems to be a tendency toward specialization of process, confining the field of operations of a certain establishment to the homogeneous branches of the industry. For example, of the 763 establishments reporting, only 226 used rags as material, 222 used purchased ground wood pulp, and 134 used domestic spruce to make ground wood. In Table 3 the tendency to specialization is seen even more clearly. The number of establishments engaged in any one line of production is generally less than one-tenth of the total number. Only 61 establishments produced news paper in rolls for printing, 88 book paper, and 64 writing paper. Manila paper was made in 51 mills, and straw paper in 55.

PAPER AND PULP.

1017

TABLE 2.—MATERIALS, AND ESTABLISHMENTS USING EACH KIND: 1900.

	Number of establishments reporting.	Unit of measure.	Quantity.		Cost.	
Total.....	763	Cords Tons.....		1,986,310 1,701,319		\$70,530,236
Establishments using:						
Wood.....		Cords.....		1,986,310		9,837,516
Domestic spruce, for ground wood.....	184	Cords.....	598,229		\$2,855,872	
Domestic spruce, for sulphite and soda fiber.....	40	Cords.....	561,889		2,731,070	
Canadian spruce, for ground wood.....	41	Cords.....	120,820		868,187	
Canadian spruce, for sulphite and soda fiber.....	21	Cords.....	228,264		1,404,308	
Domestic poplar, for soda fiber.....	28	Cords.....	236,320		1,108,132	
Canadian poplar, for soda fiber.....	7	Cords.....	20,133		90,962	
Other pulp wood, for ground wood.....	62	Cords.....	67,791		298,304	
Other pulp wood, for sulphite and soda fiber.....	27	Cords.....	152,864		490,681	
Rags, including cotton and flax waste, and sweepings.....	226	Tons.....		234,514		6,595,427
Old or waste paper.....	397	Tons.....		356,193		4,869,409
Manila stock, including jute bagging, rope, waste, threads, etc.....	161	Tons.....		99,301		2,437,256
Straw.....	112	Tons.....		367,305		1,395,659
Fiber.....		Tons.....		644,006		18,369,464
Ground wood pulp, purchased.....	222	Tons.....	261,962		4,361,211	
Soda wood fiber, purchased.....	142	Tons.....	94,042		3,430,809	
Sulphite wood fiber, purchased.....	334	Tons.....	278,194		10,112,189	
Other chemical fiber, purchased.....	20	Tons.....	14,808		466,255	
Chemicals.....	598					6,140,678
Clay.....	294					1,493,469
Colors.....	410					705,355
Sizing.....	376					826,245
All other stock.....	119					817,075
Fuel, rent of power and heat, mill supplies, freight, and all other materials.....						17,042,683

TABLE 3.—PRODUCTS, AND ESTABLISHMENTS PRODUCING EACH KIND: 1900.

	Number of establishments reporting.	Quantity (tons).		Value.	
Total.....	763		3,347,128		\$127,326,162
Establishments producing:					
News paper.....					
In rolls, for printing.....	61	454,572	569,212	\$16,764,992	20,091,874
In sheets, for printing.....	60	114,640		4,336,882	
Book paper.....			351,702		24,870,951
Book.....	88	282,093		19,466,804	
Cover.....	23	18,749		1,655,376	
Plate, lithograph, map, woodcut, etc.....	25	22,866		2,018,958	
Cardboard, bristol board, card middles, tickets, etc.....	28	28,494		1,719,813	
Fine paper.....			112,707		15,895,974
Writing paper.....	64	90,204		12,222,870	
All other fine paper.....	30	22,503		3,673,104	
Wrapping paper.....			585,252		24,542,373
Manila (rope, jute, tag, etc.).....	51	89,419		5,929,764	
Heavy wrapping (mill wrappers, etc.).....	78	82,875		4,143,240	
Straw.....	55	91,794		2,027,618	
Bogus or wood manila, all grades.....	91	208,826		9,148,077	
All other wrapping.....	62	67,838		3,293,174	
Boards.....			365,617		10,353,319
Binders and trunk.....	41	27,774		858,745	
Leather.....	29	11,351		677,807	
Press and album.....	10	3,745		325,017	
Wood pulp.....	19	44,187		1,406,130	
Strawboard.....	69	167,534		3,187,342	
News.....	20	32,119		930,631	
All other boards.....	48	88,907		2,067,747	
All other paper products.....			233,108		12,154,555
Tissues.....	56	28,406		3,486,652	
Blotting.....	11	4,351		680,750	
Building, roofing, asbestos, and sheathing.....	50	96,915		3,025,967	
Carpet lining.....	24	16,622		448,230	
Hanging.....	25	54,330		2,265,945	
Curtain.....	3	208		11,495	
Miscellaneous.....	46	32,271		2,836,116	
Ground wood pulp.....			586,374		4,433,699
Made for own use.....	77	306,322			
Made to sell as such.....	91	280,052		4,433,699	
Soda fiber.....			177,124		3,612,602
Made for own use.....	16	78,110			
Made to sell as such.....	20	99,014		3,612,602	
Sulphite fiber.....			416,037		10,451,400
Made for own use.....	29	144,452			
Made to sell as such.....	40	271,585		10,451,400	
All other products.....					919,415

Table 2 shows that spruce, domestic and foreign, constitutes the greater part of the materials of all kinds used in this industry. It forms 76 per cent of all wood for both mechanical pulp and chemical fiber, 719,049 cords being used for ground wood pulp, and 790,153 cords for fiber by sulphite and soda processes. The quantity used for soda fiber is not separated from that used for sulphite fiber, but a wood softer than spruce is generally used for the soda process. Poplar is used almost entirely for soda fiber and forms 12.9 per cent of all the wood consumed in making the different kinds of pulp. Other unspecified woods for pulp or fiber make up the remaining 11.1 per cent. There were 644,006 tons of fiber purchased by paper manufacturers during the year, but, as shown in Table 3, 528,884 tons, or nearly half the pulp produced by the various processes, was made into paper by the same establishments and consequently does not appear in Table 2. Of the \$70,530,236 reported as the cost of all materials in 1900, only \$13,902,092 represents the cost of rags, old paper, and manila stock, which fifty years ago were the only materials for paper making. From this it may be realized to what extent the modern process of making paper from wood fiber has supplanted the old.

From Table 3 it appears that the greatest quantity of paper made was news paper, of which 454,572 tons in rolls, valued at \$15,754,992, were produced by 61 establishments, and 114,640 tons, worth \$4,336,882, were made in sheets by 60 establishments. The product of greatest value was book paper, for which \$24,870,951 was received for the 351,702 tons produced. From this table it is seen that the products of this industry are of two general classes: First, paper, comprising many varieties which in the table are grouped under six general divisions; and second, pulp, which includes ground wood, and soda and sulphite fibers. It will be noted that the tonnage and value of pulp are included among the products only when made for sale, and among the materials only when purchased by the mill consuming it; for pulp made and used in the same establishment,

only the tonnage is reported. No other method of considering this somewhat delicate problem of the valuation of wood pulp seems to be practicable, and this has been consistently followed throughout the collection of data in regard to this branch of the industry.

Table 4 presents a comparative summary of the power used in 1890 and 1900.

TABLE 4.—POWER: COMPARATIVE SUMMARY, 1890 AND 1900.

	1900	1890
Number reporting power.....	763	632
Total horsepower.....	764,847	297,724
Owned—		
Engines—		
Steam—		
Number.....	2,016	1,115
Horsepower.....	255,854	93,339
Gas or gasoline—		
Number.....	13	
Horsepower.....	1,082	
Water wheels—		
Number.....	3,209	2,150
Horsepower.....	504,782	202,721
Electric motors—		
Number.....	91	(¹)
Horsepower.....	2,729	164
Other power, horsepower.....	180	5
Rented—		
Horsepower.....	266	1,435
Furnished to other establishments.....	3,400	(¹)

¹ Not reported.

Table 4 shows that each of the 763 establishments reporting for 1900 used power. Of the 649 establishments in 1890, 632 used power, leaving 17 which used none. Abundant power is now so important in this industry that availability of waterpower is a more important factor in determining the location of plants than nearness to the source of material or to a market. In 1900, as in 1890, about two-thirds of the total horsepower was developed by water wheels and less than one-third by steam engines. Most mills now use both kinds of power, water for grinding the wood and for the beating and washing machines, and steam for the paper machines, the exhaust being utilized for drying the paper.

Table 5 is a comparative summary of the leading statistics of the industry by states for 1890 and 1900.

This page was intentionally left blank.

MANUFACTURES.

TABLE 5.—COMPARATIVE SUMMARY OF THE

STATES.	Year.	Number of establishments.	Capital.	AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.					Miscellaneous expenses.	Cost of materials.	PRODUCTS.			
				Average number.	Total wages.	Men, 16 years and over.	Women, 16 years and over.	Children, under 16 years.			Aggregate value.	Paper.		
												Total value.	Quantity (tons.)	Value.
1 United States.	1900 1890	768 649	\$167,507,713 89,829,548	49,646 31,050	\$20,746,426 13,204,828	41,547 24,015	7,930 6,767	169 268	\$10,184,106 6,770,681	\$70,530,236 44,228,480	\$127,326,162 78,937,184	\$107,909,046 69,294,806	569,212 196,053	\$20,091,874 13,106,484
2 California.	1900 1890	5	421,004	169	104,771	155	12	2	74,649	399,901	630,262	630,262	4,445	402,500
3 Colorado.	1900 1890													
4 Connecticut.	1900 1890	49 42	3,968,152 3,920,916	1,425 1,393	633,413 625,522	1,157 988	268 394	11	279,962 302,592	1,982,080 2,014,680	3,565,021 3,556,257	3,493,596 3,175,052	200	20,000
5 Delaware.	1900 1890	6	2,143,108	451	193,783	372	79		90,785	1,028,274	1,599,718	1,169,405		
6 Georgia.	1900 1890	3	117,400	70	16,800	52	18		5,025	45,695	93,874	84,374	247	23,055
7 Illinois.	1900 1890	15 21	1,554,858 1,687,881	623 758	250,303 315,882	577 686	37 49	9 23	72,650 119,214	708,370 551,329	1,431,618 1,467,289	1,431,618 1,449,969	1,500	112,500
8 Indiana.	1900 1890	39 29	5,379,227 1,613,275	1,816 805	723,972 340,045	1,720 720	93 75	10 8	226,156 134,032	2,470,623 873,320	4,170,497 1,776,016	3,600,968 1,514,681	6,400 12,662	320,000 853,522
9 Iowa.	1900 1890	4 7	182,045 324,498	180 187	63,689 71,605	132 156	28 29	20 2	13,350 18,285	106,615 116,349	243,776 268,934	243,776 268,934		
10 Kansas.	1900 1890													
11 Kentucky.	1900 1890													
12 Maine.	1900 1890	35 17	17,473,160 4,273,825	4,851 1,509	2,162,972 669,057	4,560 1,442	291 67		1,894,967 322,808	7,118,945 1,673,237	13,223,275 3,281,051	9,394,646 1,762,440	122,738 7,608	4,122,050 611,188
13 Maryland.	1900 1890	21 17	2,720,877 919,766	937 472	326,474 171,209	839 376	98 88		105,571 157,569	1,780,910 552,604	2,589,540 1,001,945	1,754,060 932,945	810 4,530	49,748 291,447
14 Massachusetts.	1900 1890	38 85	26,692,922 22,467,036	9,061 7,817	3,938,400 3,420,459	5,626 4,557	3,428 3,246	8 14	1,693,505 1,832,753	11,918,802 12,210,458	22,141,461 20,491,171	21,549,232 20,491,527	22,194 17,320	810,705 1,308,000
15 Michigan.	1900 1890	27 31	4,505,741 2,712,773	2,014 1,219	700,826 519,432	1,534 966	479 242	1 11	264,373 192,302	2,707,827 1,711,436	4,217,869 2,919,166	3,871,120 2,286,484	150 3,361	10,200 240,898
16 Minnesota.	1900 1890													
17 Nebraska.	1900 1890	3	185,500	75	19,592	73	2		14,908	27,123	90,995	90,995		
18 New Hampshire.	1900 1890	29 15	3,163,081 1,221,491	2,391 520	1,036,856 220,122	2,223 387	168 133		539,955 65,747	3,953,334 715,081	7,244,733 1,282,022	4,303,505 1,111,022	57,878 970	2,078,604 58,200
19 New Jersey.	1900 1890	34 21	3,670,717 1,882,193	1,190 515	553,463 236,523	1,080 426	152 84	8 5	242,793 81,268	1,715,312 724,236	3,195,302 1,377,385	3,188,122 1,306,555		
20 New York.	1900 1890	179 163	37,349,390 17,124,359	9,268 5,339	4,099,771 2,234,747	8,311 4,363	451 434	6 2	2,398,994 1,417,066	14,563,222 8,061,038	26,715,628 14,192,240	21,418,285 11,530,481	204,957 75,464	6,879,013 4,606,754
21 North Carolina.	1900 1890													
22 Ohio.	1900 1890	51 50	7,872,913 7,581,536	3,184 2,921	1,113,040 1,153,625	2,542 2,332	629 558	13 31	479,386 513,037	3,768,572 3,991,377	6,543,613 7,209,750	6,142,580 7,133,045	7,517 10,571	354,556 730,891
23 Oregon.	1900 1890	5	2,161,186	716	282,896	708		8	147,417	582,078	1,305,696	1,290,186	21,416	856,646
24 Pennsylvania.	1900 1890	73 72	16,424,107 9,404,772	4,340 2,951	1,989,128 1,256,340	4,033 2,216	756 678	51 57	1,090,321 646,472	6,374,315 4,646,456	12,267,900 7,835,299	11,355,637 7,032,399	1,031 10,588	51,543 779,017
25 Utah.	1900 1890													
26 Vermont.	1900 1890	27 21	4,853,806 3,151,911	1,216 1,065	571,018 487,529	1,129 1,003	86 62	1	285,569 235,742	1,684,922 1,280,722	3,384,773 2,449,049	2,656,025 2,134,639	26,166 16,237	930,818 1,043,793
27 Virginia.	1900 1890	7 4	2,281,903 438,903	302 181	102,938 62,365	242 131	60 46		57,829 16,236	410,640 143,972	850,386 310,991	651,114 303,291	1,320 600	72,600 50,000
28 West Virginia.	1900 1890	6	926,463	281	93,329	263	18		44,193	274,316	527,527	168,500		
29 Wisconsin.	1900 1890	47 27	16,580,140 5,360,624	4,240 1,779	1,649,010 691,492	3,437 1,284	775 479	28 16	664,591 362,634	6,712,749 2,588,863	10,895,576 4,475,368	9,037,461 4,015,607	90,075 23,988	3,253,391 1,764,034
30 All other states.	1900 1890	16 26	2,603,917 5,120,385	660 1,305	251,190 587,711	612 1,202	34 71	14 32	111,769 258,292	628,380 1,870,545	1,212,353 8,192,118	1,099,210 2,037,104	6,560 6,762	272,000 647,585

1 Not separately reported.
 2 Included in "all other states."
 3 No establishments reported.
 4 Exclusive of wood-pulp mills included with "all other states" in 1890.
 5 Includes establishments distributed as follows: California, 2; Colorado, 2; Georgia, 2; Kansas, 2; Minnesota, 2; North Dakota, 1; South Carolina, 1; Texas, 2; Washington, 2.

Table 5 shows that of the 763 establishments reported for the industry, 179 were located in the state of New York, 93 in Massachusetts, and 73 in Pennsylvania, these three states containing 45.2 per cent of the total number. New York ranked first, not only in the number of establishments, but also in amount of capital invested, in number of wage-earners and wages paid, in cost of materials, and in value of products. In number of establishments the three leading states retained the same relative rank that they had in 1890. In capital, again Massachusetts was second, but Maine took third place; in 1890 the places of Massachusetts and New York were reversed and Pennsylvania ranked third, dropping to fifth in 1900. In number of employees and amount of wages, New York had passed Massachusetts, and Pennsylvania, which was third in 1890, was supplanted by Maine. In value of products, also, the rank was New York, Massachusetts, Maine, in 1900, instead of Massachusetts, New York, Pennsylvania, as in 1890. As to the different classes of products, New York led in wood pulp, news paper, wrapping paper, and "other paper products" not specially designated. Indiana produced more boards than any other state, and Massachusetts was first in the production of book paper and fine writing paper.

Nearness to supply of raw material is a great advantage to mills using wood; and this is apparently an important factor in the great growth of the paper industry shown in the table for Maine, New Hampshire, Vermont, and New York. In these states the capital invested was increased from \$25,771,586 in 1890 to \$67,839,437 in 1900, and the mills which in 1890 represented 28.7 per cent of the capital invested in the industry for the whole country, in 1900 represented 40.5 per cent. The main spruce supplies of the United States are to be found in this group of states, which use about two-thirds of all the domestic spruce made into pulp, the three New England states employing it rather more for chemical, and New York for mechanical pulp, as is shown in Table 7. That table shows, further, that New York and New Hampshire together use two-thirds of all Canadian wood of all kinds imported for pulp, the Canadian supply being about one-fifth of the entire supply of wood used for pulp. The quantity of rags used by this group is relatively insignificant, constituting not more than 13.2 per cent of the total quantity reported for the United States. In New York state about 14.5 per cent of the old paper supply and 23.8 per cent of the manila stock is consumed.

The paper produced in these states corresponds to the raw materials used, Maine, New Hampshire, and Vermont in 1900 producing 36.3 per cent of the news paper manufactured in the United States, and New York 36 per cent, making altogether nearly three-fourths of the total product. These same states made 23.7 per cent of the book paper, while New York alone made 25.5 per cent of the manila wrapping paper and 16 per cent of the straw wrapping paper. In the three New England states named, no writing paper was made, and the quantity made in New York was inconsiderable.

Mills using rags as their principal material, and producing writing and other fine papers, are located with regard to availability of power rather than source of supply. These mills are found chiefly in Massachusetts, Pennsylvania, and Wisconsin, Massachusetts alone using two-fifths of the rag supply and producing 60.7 per cent of the writing paper. Little news paper, but considerable book and building paper, is made in this state. Pennsylvania and Wisconsin use about one-fourth of the supply of rags, and make 30.1 per cent of the writing paper. Wisconsin, however, has considerable available timber and is a wood-using state, employing 10.8 per cent of the entire domestic spruce supply and producing 15.8 per cent of the news paper.

Certain states show certain other specialties. Connecticut produces an especially large proportion of the cover and heavy wrapping papers, binders, trunk boards, news boards, and similar grades. Pennsylvania makes nearly one-half of all the building and roofing paper. Indiana makes a considerable part of the supply of wood-pulp boards and other boards; New Jersey makes about one-half of the news boards.

States in the farming region of the middle West are shown in Table 7 to be the great consumers of straw, and producers of straw wrapping paper and strawboard. Indiana, Ohio, and Illinois together use four-fifths of the straw employed in paper making, and produce over half of the straw wrapping paper and 83 per cent of the strawboard.

Illinois, with 15 establishments and only a million and a half of capital invested in the paper industry, used one-fifth of the straw, and produced one-third of the straw wrapping paper. Indiana alone used one-third of the straw, and produced almost one-half of the strawboard.

The statistics for the manufacture of wood pulp as a distinct industry at the census of 1890 do not show the quantities and values of the different classes of materials and products. In Table 5 only the total cost of all classes of materials, the total value of all products, the quantities and values of the kinds of paper produced, and the total value of the ground-wood pulp are separately shown. The value of the wood pulp sold by paper mills is combined with the total value of all products of pulp mills for 1890, and this value is placed in comparison with the value of wood pulp reported as made for sale at the census of 1900; the value of the soda and sulphite fiber separately reported in both years is included with all other products. While this is not an exact comparison, it nevertheless indicates the value of pulp made for sale as reported at the two censuses. Among the products reported for the paper mills in 1890 were 64,721 tons of ground-wood pulp, valued at \$1,243,630; 16,214 tons of soda-wood fiber, valued at \$840,909; and 6,845 tons of sulphite fiber, valued at \$368,050. The quantities and values of these classes of products for the combined paper and pulp mills in 1900 are shown in Table 7.

The full extent of the growth of the wood pulp industry is not realized, however, until both quantity and

value of product are taken into account. Values for 1900 represent a far larger proportionate quantity of output than those for 1890, owing to the steady and large decline in prices during the decade. Only values, not quantities, were given for the product of wood pulp mills in 1890; that the increase in total value was considerably less, however, than in total quantity may be inferred from the fact that the value of ground wood per ton (computed on the basis of cost of material used in the paper industry as reported at the two censuses) dropped, between 1890 and 1900, from \$19.88 to \$16.60, of soda fiber from \$62.45 to \$36.50, and of sulphite fiber from \$62.61 to \$37. In 1890 the production of news paper was 196,053 tons, with a value of \$13,106,434, indicating a value of about \$67 per ton; in 1900 the product of 569,212 tons was valued at \$20,091,874, or about \$35 per ton. A similar reduction in price is seen in book paper. In 1890 the product was 158,173 tons, valued at \$16,921,864, or \$107 per ton; while in 1900 the quantity produced was 351,702 tons, valued at \$24,870,951, or \$71 per ton. Even after allowance is made for the fact that the prices of paper products were the lowest ever known, the full growth of the industry is scarcely shown by the figures for the census year. During the latter half of 1899 the production of all mills dependent on waterpower was greatly lessened owing to the severe drought that prevailed at that time. The census statistics, however, are intended to show not the full capacity of all plants engaged in the industry, but the actual production.

Table 6 presents a statement of imports and exports of paper and pulp for each year from 1880 to 1900, inclusive.¹

¹ Figures for imports and exports are those furnished by the United States Treasury Department, Bureau of Statistics.

TABLE 6.—IMPORTS AND EXPORTS, 1880 TO 1900.

YEARS.	PAPER.			WOOD PULP.			
	Imports.		Exports.	Imports.		Exports.	
	Paper and manufactures of paper. (Value.)	Paper stock, crude. (Value.)	Paper and manufactures of paper. (Value.)	Tons.	Value.	Pounds.	Value.
1900...	\$3,795,645	\$3,261,778	\$6,215,833	82,441	\$2,405,630	28,554,801	\$458,468
1899...	3,191,589	2,614,914	5,477,884	83,319	671,506	55,932,270	696,319
1898...	2,838,738	2,870,323	5,494,564	29,846	601,642	50,428,161	536,670
1897...	3,121,530	3,071,705	3,833,163	41,770	800,886	(1)	(1)
1896...	3,169,480	3,445,723	2,713,875	45,143	1,052,829	(1)	(1)
1895...	2,863,533	3,786,026	2,185,287	28,440	958,009	(1)	(1)
1894...	2,628,351	3,048,094	1,906,634	35,687	1,664,547	(1)	(1)
1893...	3,880,981	6,272,298	1,540,886	63,565	2,908,884	(1)	(1)
1892...	3,342,304	5,448,263	1,382,251	41,118	1,820,148	(1)	(1)
1891...	3,031,454	5,019,533	1,299,169	43,316	1,902,689	(1)	(1)
1890...	2,816,860	5,261,448	1,226,686	(1)	(1)	(1)	(1)
1889...	2,542,383	5,925,047	1,191,035	(1)	(1)	(1)	(1)
1888...	2,400,790	5,463,036	1,078,561	(1)	(1)	(1)	(1)
1887...	2,028,235	4,540,598	1,118,538	(1)	(1)	(1)	(1)
1886...	1,838,822	5,194,951	1,106,616	(1)	(1)	(1)	(1)
1885...	1,592,392	5,827,878	972,493	(1)	(1)	(1)	(1)
1884...	1,714,419	5,638,647	929,821	(1)	(1)	(1)	(1)
1883...	1,958,113	5,329,876	1,614,950	(1)	(1)	(1)	(1)
1882...	2,084,289	6,014,183	1,681,370	(1)	(1)	(1)	(1)
1881...	1,841,840	5,245,691	1,408,976	(1)	(1)	(1)	(1)
1880...	1,671,120	7,037,197	1,201,143	(1)	(1)	(1)	(1)

¹Not reported separately.

This table shows that from 1880 to 1890 our export trade in paper scarcely held its own. In 1880 it was \$1,201,143 as against imports amounting to \$1,671,120 during the same year; in 1890, the last year of the decade and the date of the Eleventh Census, it showed but a slight increase, total paper exports being only \$1,226,686, while imports had increased to \$2,816,860. During two years of this decade (1884 and 1885) the total value of exports fell below \$1,000,000.

From 1890 to the date of the present census the growth of our export trade in this commodity was steady and healthy, amounting in 1900, with wood pulp included, to a total of \$6,674,296, an increase of nearly 500 per cent during the decade. The grades exported are largely wood papers (especially news), while the usual imports are of the higher grades of book and fancy papers and specialties.

The total exports of the world in 1899 of paper and the manufactures of paper, and of wood pulp were about \$91,000,000. The exports of the United States in that year amounted to \$6,174,203, or nearly 7 per cent of the world's export trade in these goods.

The per capita value of the paper consumed in the United States in 1900 was the greatest in the world, amounting to \$1.66. The per capita production of paper in 1860, as given in the census report for that year, was 8.1 pounds;¹ in 1900 it was 56.9 pounds.

Four industrial combinations have been organized in this industry during the past decade. During the census year these combinations controlled 10.5 per cent of the establishments. Their capital amounted to \$40,320,498, or 24.1 per cent of the total capital invested in the industry; they gave employment to 11,582 wage-earners, or 23.3 per cent of the total; paid \$4,996,528 in wages, or 24.1 per cent of the total; and the value of their products was \$30,725,020, or 24.1 per cent of the total value. These combinations have each consolidated under one central management 31, 25, 15, and 9 establishments, respectively. This change in the ownership, combined with radical changes in the method of manufacture, has made the period from 1890 to 1900 by far the most important in the history of the industry.

HISTORICAL AND DESCRIPTIVE.

Although much the same process has been used for many years in this and other countries for producing paper, the evolution of paper making through the use of improved methods and machinery, and the great change in the character of materials used at different periods, renders it desirable to add some explanation of the method of manufacture.

From the earliest Egyptian papyrus to the paper of to-day the predominant characteristic is that it consists

¹Eighth Census of the United States, Manufactures, Introduction, page cxxi.

of the enduring portion of vegetable growth known as cellulose or pure fiber. The leaves, blossoms, and stems of plant life have in turn, as experience and knowledge increased, served to furnish the raw material of this manufacture.

Modern paper making may be said to have begun with the introduction, early in the Nineteenth century, of the Fourdrinier machine, which was a development of the invention of Louis Robert, of Essonnes, France; in the last decade of the previous century, probably in 1798. Paper was made chiefly from rag fiber, which continued to be the material used in England, on the Continent, and in the United States until past the middle of the Nineteenth century, when wood fiber was introduced. In the treatment of these materials for paper making, a fluid stock was prepared by putting the rags, after sorting and cleaning, through the washing and beating machines, where the component fibers were separated and reduced to the fineness and fluidity requisite to produce smooth and uniform sheets. In 1854 the first wood pulp was made in the United States by the alkali process, but the process of mechanical grinding, upon which the present extensive pulp industry is based, was introduced at Stockbridge, Mass., in 1867, the product being used in a paper mill at Lee. A small proportion of this material was mixed with more conservative grades of stock, and the result, though far from satisfactory at first, grew better as experience taught how the new material should be used. The use of rags for making news papers has been entirely superseded by wood.

The earliest mills in this country were established before the invention of the Fourdrinier machine, and the process of making paper was therefore conducted by hand. The rag fiber, after being prepared in the beating machine, was formed into a sheet in a mold or wire sieve, which was dipped from the pulp vat by hand, the water drained off, and the pulp left in a wet sheet in the mold. Sheets so made were turned out upon a felt, pressed, and then dried by exposure to the air in single sheets. Such mills were small, employing few hands, and of limited product. Paper was made by hand at Roxboro, in the vicinity of Philadelphia, as early as 1690, by William Rittenhouse. In 1729 the Ivy Mills on Chester Creek, in Delaware county, Pa., were built by Thomas Wilcox, and up to 1866 produced handmade paper. Here was made the paper which supplied the press of Benjamin Franklin, and during the Revolution, the paper for the Continental currency. Figure 1 is an exterior view of one of the early mills, which was built in 1811, and has been operated ever since.

To a limited extent paper is still made by hand, as shown in figure 2, which is a view of the interior of a mill at Adams, Mass. At the right are seen two "vat men," each taking a mold full of prepared fiber from

the vat. The third man is stooping over to deposit the newly formed sheet on the felts, between which it is pressed in the press to the left and then taken out and (where necessary) surface sized and dried in the air.

By the Fourdrinier machine the transformation of the fluid stock to finished paper is made an automatic operation. The pulp is screened from the vat over an apron to a moving endless wire cloth made of closely woven fine brass wire, and supported by a series of small metal rolls, set close together but without touching each other. In this way an even surface of the wire cloth is maintained, and by preserving an unvarying flow of the pulp and a constant forward motion of the wire cloth the thickness of the layer of pulp deposited is kept uniform. By a violent lateral motion or "shake" of the supporting rolls the fibers are caused to interlace in various directions and give greater transverse strength to the texture. As the pulp is carried along on the wire cloth much of the water drains through, leaving the fiber on the meshes. This first drying is usually hastened by various devices. After sufficient water has drained from the pulp the moist web is carried between couch rolls which are covered with woolen felt, and there taken from the wire cloth on endless woolen felts, which pass it between press rolls, and thence to driers. These are large metal cylinders heated by steam, placed one after another or in two tiers; their number varies in different machines. By the time it has passed the press rolls the paper has acquired considerable strength from the loss of the greater part of its moisture. The heated cylinders complete the drying process, and then the paper is given a smooth surface by the calenders, which are smooth-faced heavy metal rollers arranged vertically in a stack, giving great pressure by their cumulative weight. Finally the finished paper is reeled off in rolls or cut into sheets of the desired size. Figure 3 shows a view of the widest paper machine in the world, which is running in the mills at Rumford Falls, Me. The rolls of finished paper and the calenders occupy the foreground of the cut. Figure 4 is another view in the same machine room, showing in the foreground the screens and the wire or "wet end," where the web of paper is first formed, with the driers in the background.

Another type of paper machine, known as the cylinder machine, differs from the Fourdrinier mainly in that the pulp, instead of being flowed onto a moving endless wire cloth, is taken up by a cylinder, the face of which is formed from close-meshed wire cloth, revolving partly submerged in the vat of stock. From the cylinder the net is removed by a couch roll carrying a felt, and then dried and finished essentially as in the Fourdrinier machine. There is less waste of pulp in this machine, but the paper made by it has less transverse strength, because the fibers lie mostly in the line of travel of the web, there being no "shake" to give them lateral motion.

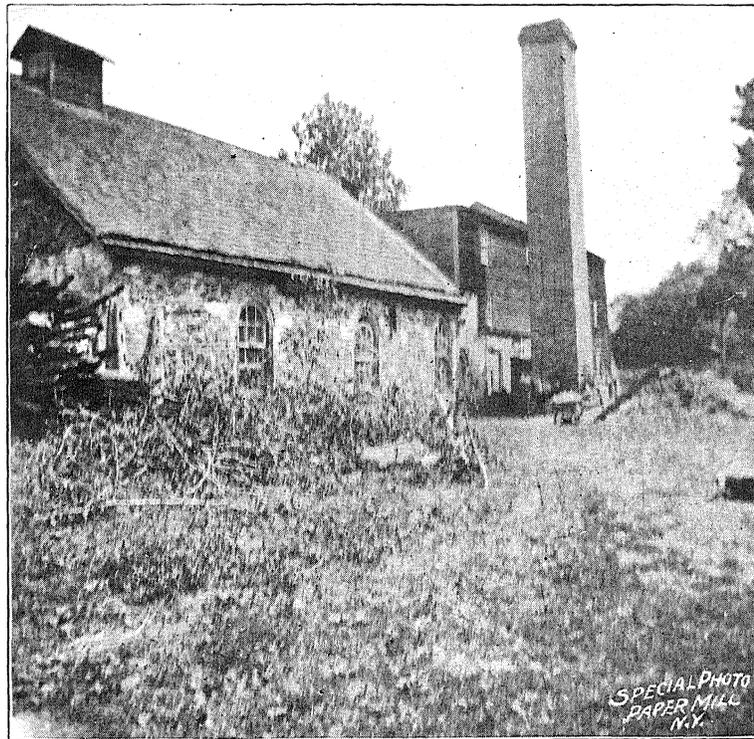


FIG. 1.—SUNNYDALE PAPER MILL—EXTERIOR. BUILT IN 1811.

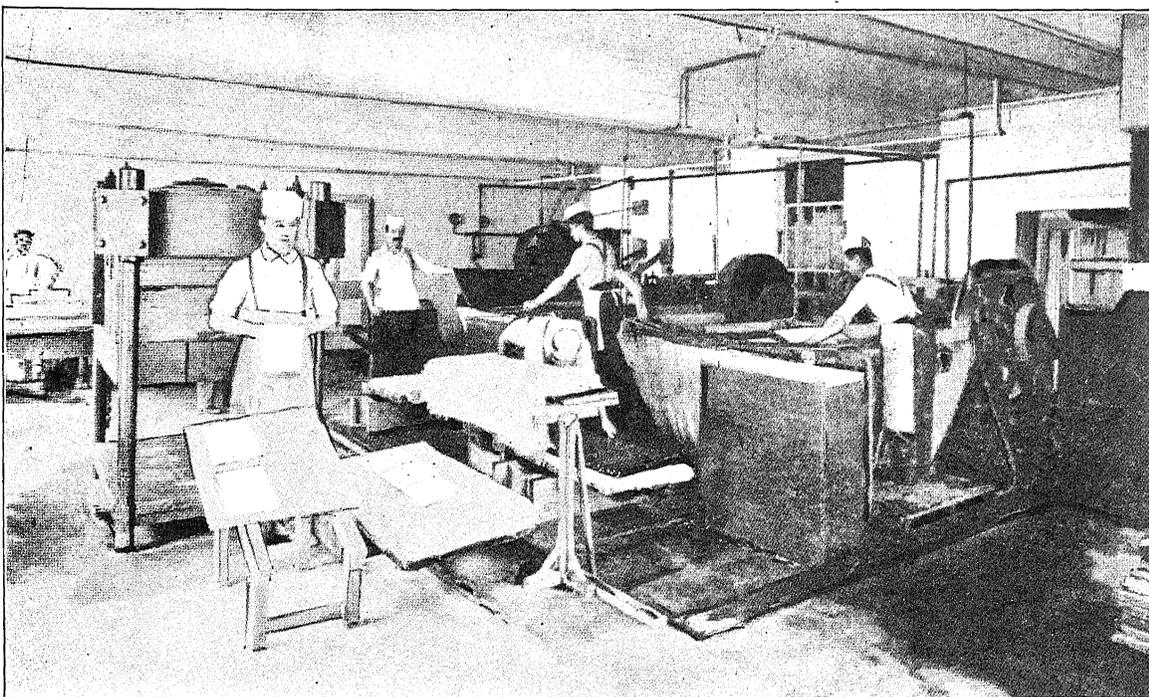


FIG. 2.—MAKING PAPER BY HAND.

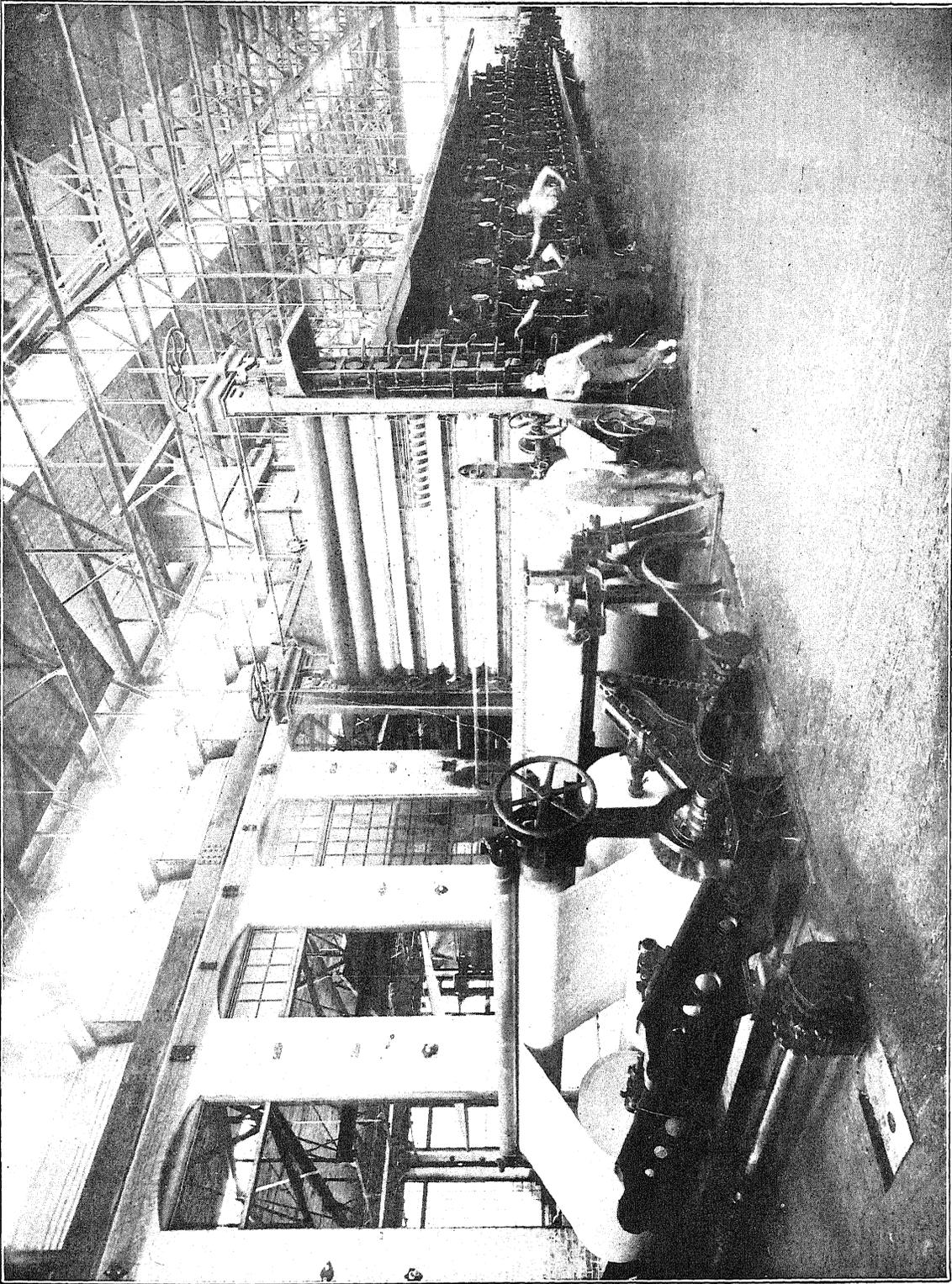


FIG. 3.—WIDEST PAPER MACHINE IN THE WORLD.

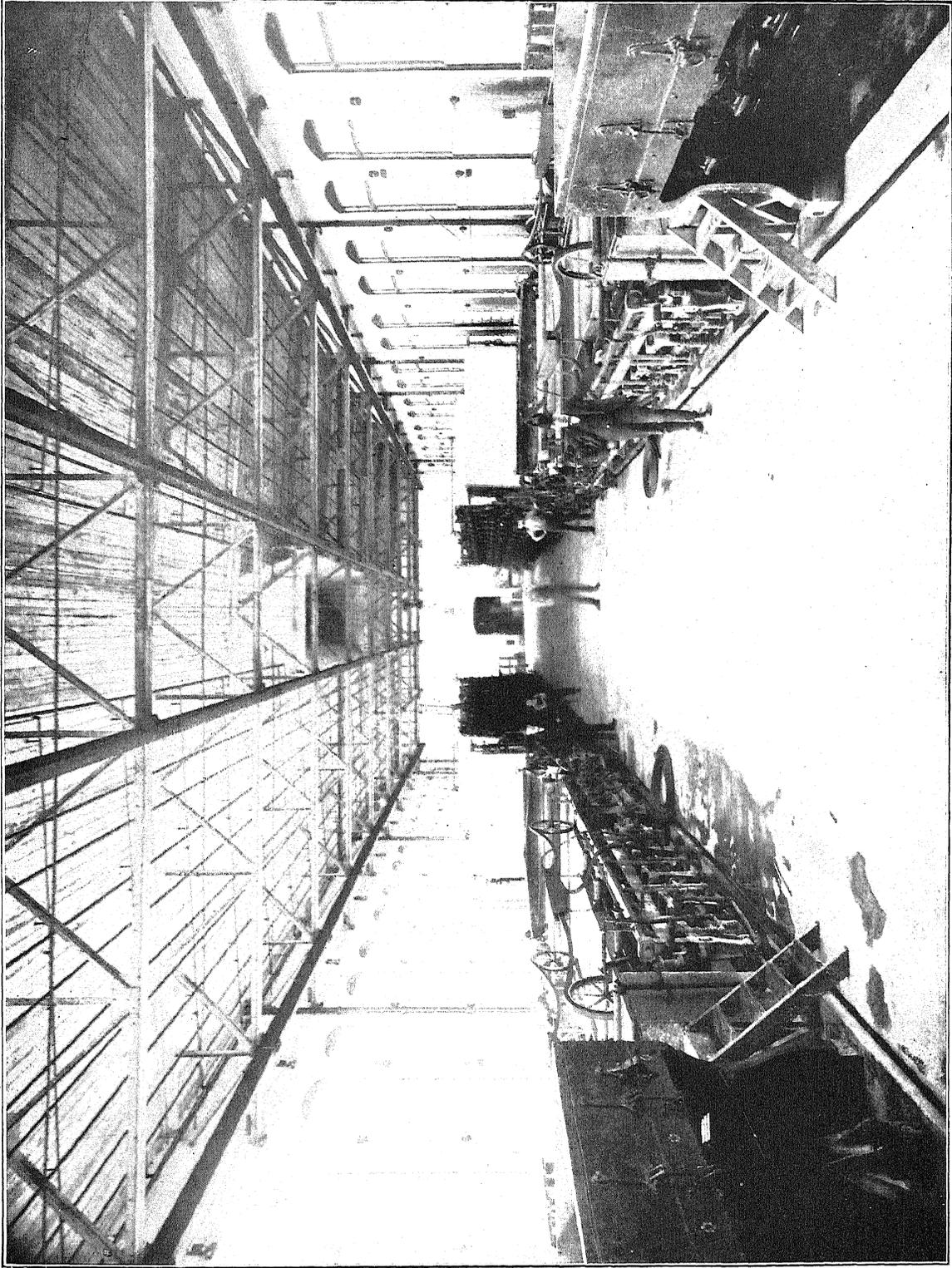


FIG. 4.—MACHINE ROOM OF MILLS AT RUMFORD FALLS, ME.

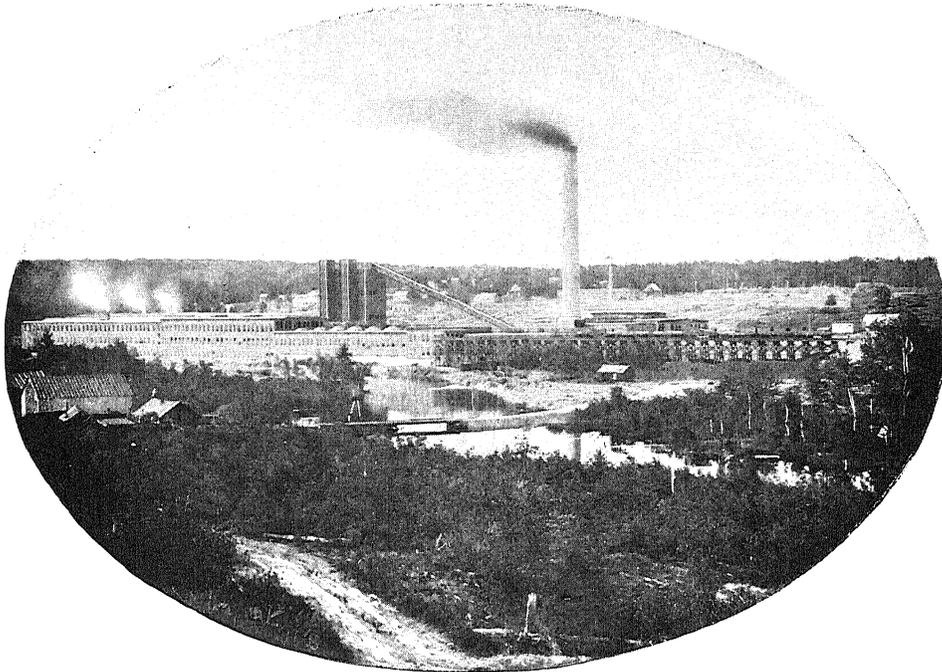


FIG. 5.—EAST VIEW, MILLINOCKET MILL.

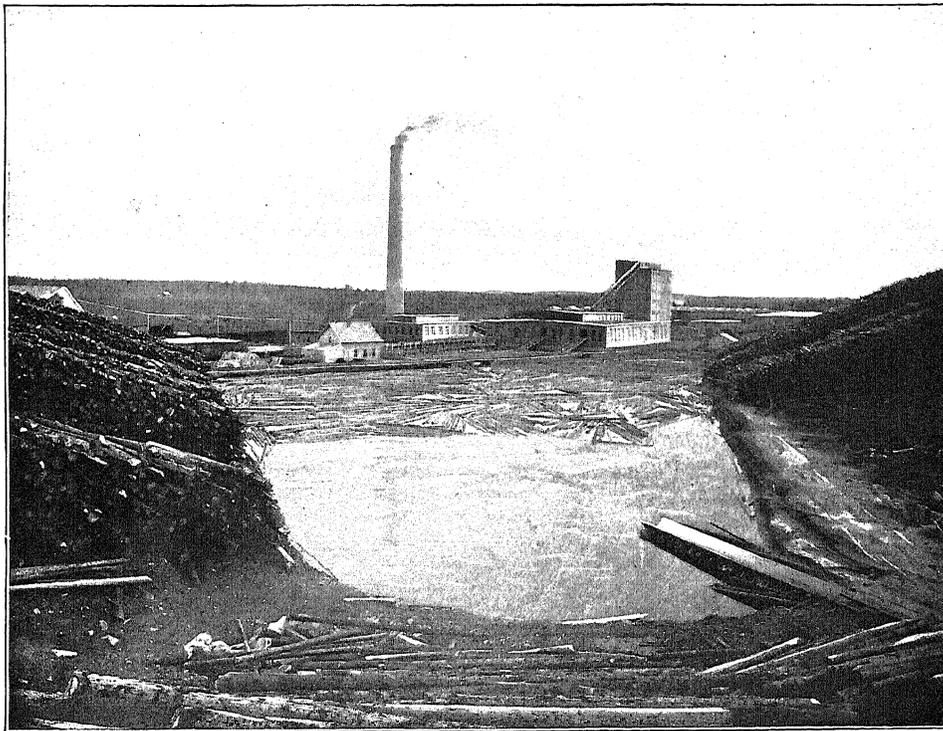


FIG. 6.—WEST VIEW, MILLINOCKET MILL.

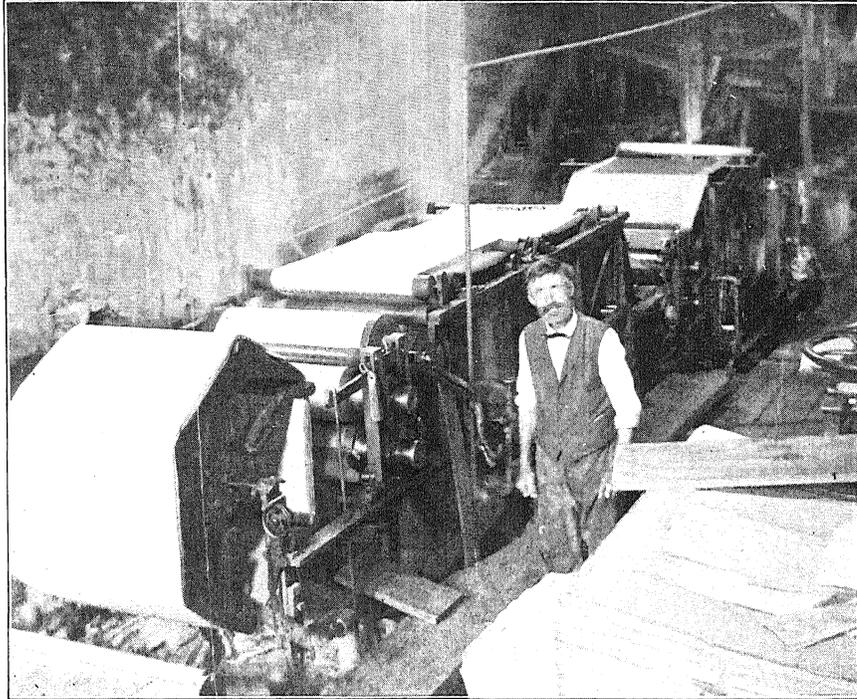


FIG. 7.—SUNNYDALE MILL—INTERIOR.

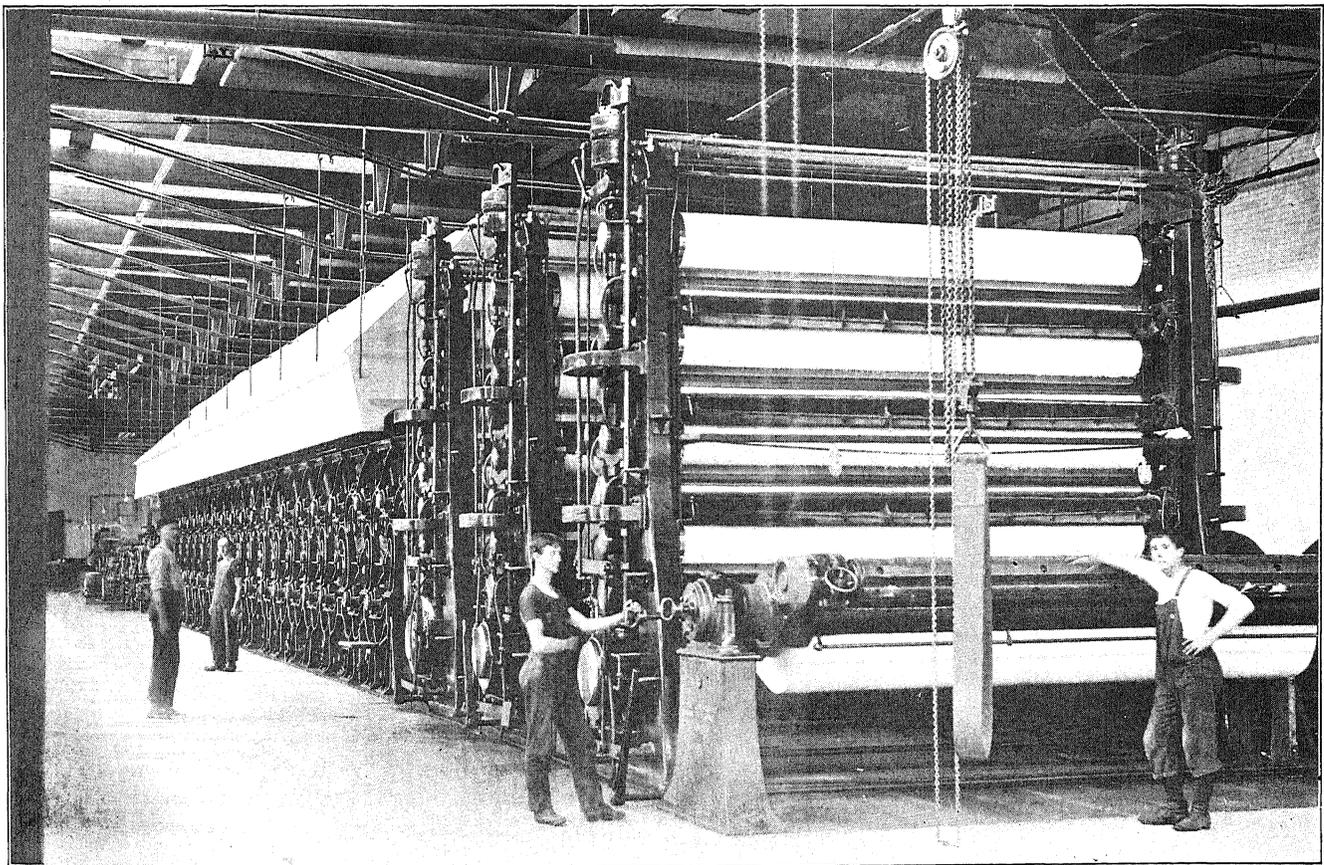


FIG. 8.—MODERN 158-INCH MACHINE. CAPACITY, 50 TONS DAILY.

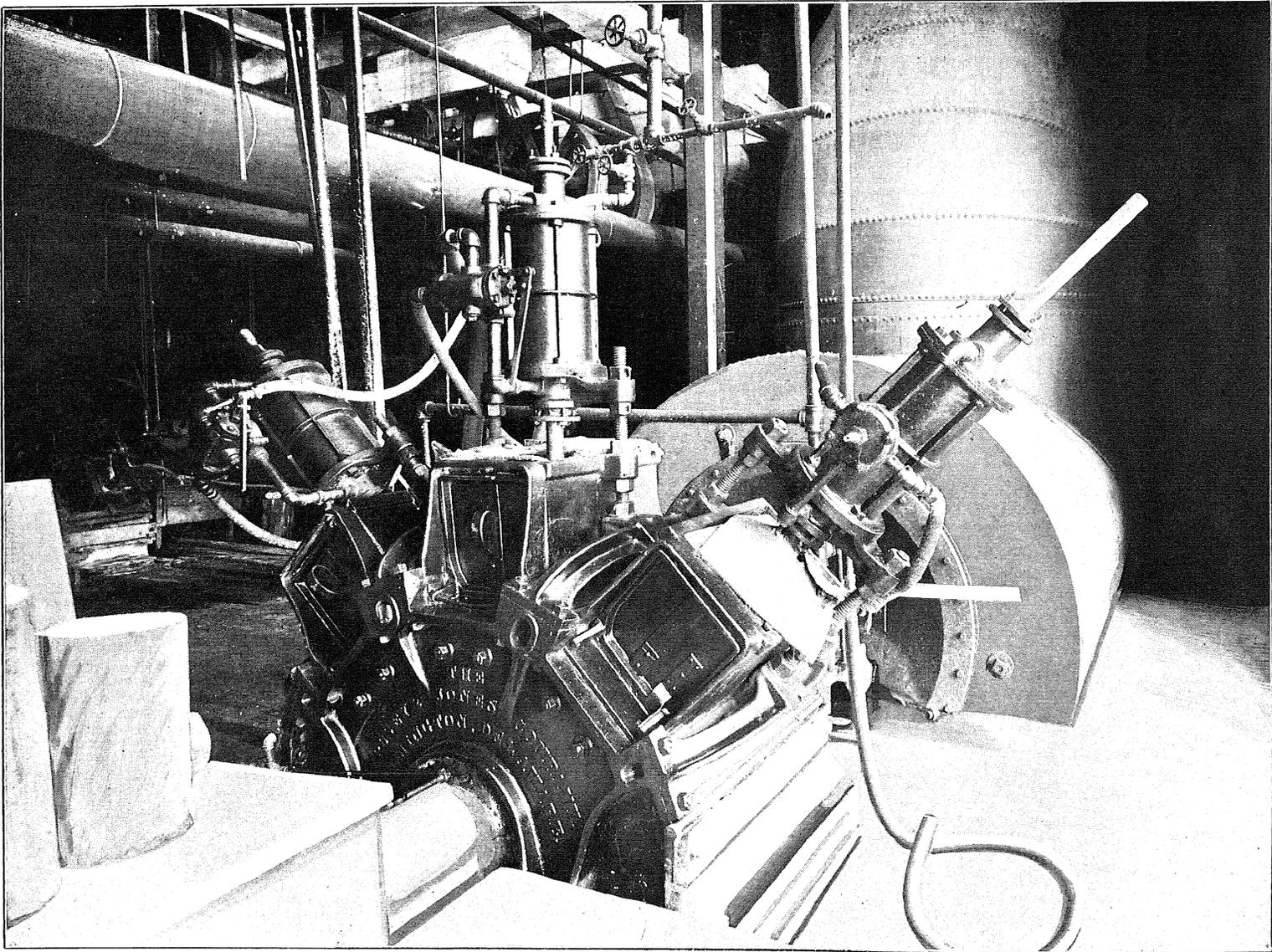


FIG. 9.—WOOD-PULP GRINDER.



FIG. 10.—INTERIOR OF PULP MILL.

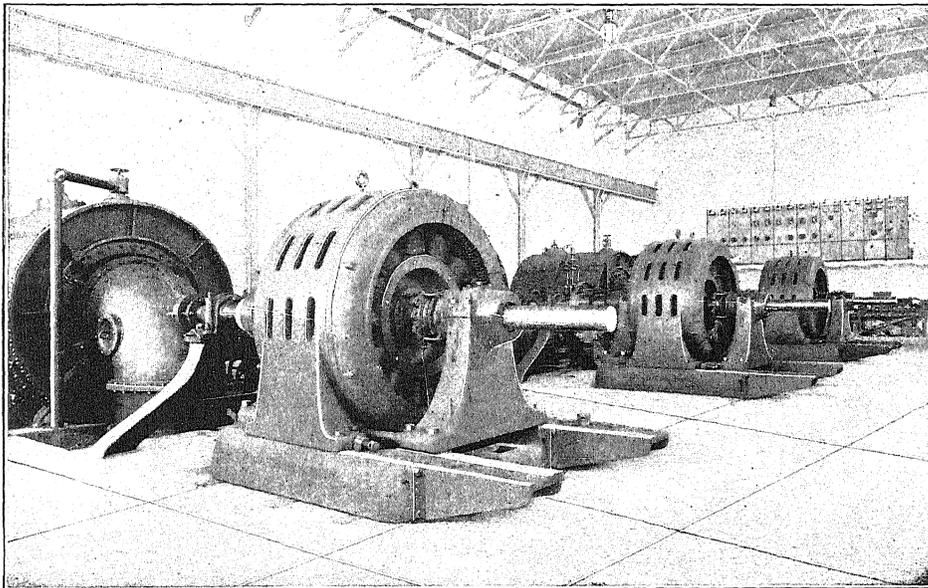


FIG. 11.—TURBINE-DRIVEN GENERATORS.

There is no more striking comparison between the old and the new in the paper industry than to note the points of difference between the earlier mills with limited product, and employing little labor outside the proprietor and his family, and some of the best modern mills. The new plant of the Great Northern Paper Company, at Millinocket, Me., is probably the largest in point of tonnage in the world, and with its houses for employees, shops, and other dependent features, forms a city in itself. It makes 250 tons of finished paper each twenty-four hours. In another plant in the same state a single machine is producing 50 tons of wrapping manila in twenty-four hours, with a daily average of nearly four-fifths of this amount.

Figure 5 gives the east view of the plant at Millinocket and figure 6 a west view of the same. Figure 7 is an interior view of the old establishment shown in figure 1. The width of the machine presented is 36 inches, and its product is about 1,000 pounds of tissue paper per week. The proprietor himself prepares the stock, operates the machine, and finishes and sells the product. Figure 8 shows a machine in the mills at Winslow, Me., which is reputed to have the largest tonnage of any paper machine in the world. It turns out a continuous web of finished paper at the rate of 500 feet a minute. The mill in which this machine is run is one of the largest and most modern wrapping-paper mills in existence, having a capacity of about 100 tons a day.

From the hand process of the early days to such huge machines as are shown in figures 3 and 8 is a progress in method of production which explains the immense increase in the volume of the products of this industry. The principles are the same whether the pulp is taken from the vat on small hand sieves and turned out a single sheet at a time, or whether it is flowed onto an endless wire cloth from which it is conveyed on blankets or felts in a continuous web through heavy press rolls and then over steam-heated drying cylinders. By the introduction of such machinery not only has the rapidity of manufacture been multiplied many times and the labor cost diminished, but the quality of the product has also become more uniform and capable of more exact regulation.

During the Nineteenth century there was a remarkable improvement in the method of making paper from the stock, while the materials from which the stock is made were revolutionized in the last half of the century. Although various attempts had previously been made to provide a cheaper substitute for paper rags, and many other materials are used to some extent, yet the cheapness of wood pulp and the abundance of wood from which it can be made have brought about changes that appear almost marvelous.

The raw material of wood pulp is spruce, poplar, and, in smaller quantities, various other woods, according to the location of plant, the process employed, and

the kind of paper in which the material is to be used. To a very great extent this material has superseded the use of rags, entirely so in the manufacture of news papers, very largely so in the manufacture of book and wrapping papers, and to a considerable proportion in writing and other grades. Treated mechanically or chemically, it furnishes all the essential qualities in nearly every grade of paper. The history of the discovery that wood could be made into paper, and the gradual adoption of this material, would be too extensive for the purpose of this report.

Many varieties of woods are suitable for ground wood pulp, but spruce is the principal raw material. In preparing the pulp the wood is cut into suitable lengths for grinding, the bark removed, and the blocks held by hydraulic pressure against the edge of a rapidly revolving grindstone and by attrition reduced to a mushy consistency. Figure 9 shows such a wood pulp grinder by which the pulp is mechanically produced from wood.

The fiber as thus ground is screened and either used in a liquid state for the paper machines in the same establishment or run over "wet machines" into thick sheets which are folded into bundles and shipped to points where they are to be used. The pulp so made is the basis of all lower grades of paper. As already noted, the pulp industry has become an integral part of the paper business, over half of the ground wood produced being made into paper on the spot. Figure 10 shows the interior of a pulp mill with the sheets of prepared pulp.

Since the introduction into this country, in 1866 or 1867, of the German process for making a ground wood fiber, its use has steadily increased until it has nearly driven other materials from the field, except for higher or special grades of paper. When the manufacture of wood pulp first appeared as an industry in the census of 1870, 8 establishments were reported, with products valued at \$172,350. In 1880 there were 50 establishments, with products valued at \$2,256,946. In 1890, 82 establishments reported products valued at \$4,627,796. The first wood pulp made in this country was sold at 8 cents per pound; to-day the price is less than 1 cent. Doubtless the general adoption of the new material was aided by the great scarcity of rags and the high range of prices prevailing in the sixties. Rags were worth from 4 to 6 cents a pound, and news paper was selling at 14 and 15 cents and book paper from 27 to 35 cents, double or triple the prices prevailing just before the war. The cheapness of the wood fibers commended them for all purposes where they could be used, and stimulated the efforts to adapt them to more extended uses. The profusion of the wood supply in the great forests of spruce and other woods in the United States renders this a cheap material, and competition and improvements in process have reduced the cost still further in recent years.

Sulphite fiber, next in importance as a product in the pulp industry, is made by a chemical method of producing fiber instead of a mechanical, as in the case of ground wood. For both processes, however, spruce is the most common material, though many other woods are used. The wood after being barked is cut into small chips, which are dissolved by boiling or cooking with sulphurous acid in large boiling tanks or digestors. The product, after being washed and otherwise prepared for use, has a much longer fiber than a mechanically prepared pulp, and is used to give strength to papers in which that quality is required. News, common wrapping papers, and some other grades consist chiefly of ground wood with 10 to 25 per cent of this chemically prepared sulphite added to hold them together. Other grades, e. g., strong wrapping papers, are made entirely from sulphite fiber.

This process is of American invention and was first used in 1867. Its early development was slow, owing to the difficulty of procuring the necessary apparatus. The strong chemicals employed penetrated the linings of the digestors as then constructed, eating into their shells and rapidly spoiling them for use, and until recently no species of lining had been found to resist the attacks of the acid and keep the digestors whole. Within a few years, however, linings have been invented which secure this end and the sulphite process is now established as the leading method of production of chemical pulp.

Soda fiber is ordinarily made from woods softer than spruce, chiefly poplar, and is a softer, mellower fiber, without much strength. It is used as a soft stock in book, and to some extent in writing papers. Its preparation is similar to that of sulphite, except that in place of sulphurous acid a solution of caustic soda is used in the digestors. The process is older than either of the two just mentioned, having been introduced into this country from England in 1854. It came into extended use earlier than the sulphite fiber, but owing to the greater cheapness of the sulphite process in producing a strong cellulose fiber from spruce, the use of the latter has increased more rapidly than that of soda.

The merchantable shape of these fibers differs somewhat. Ground wood is ordinarily sold in folded sheets only partially dry, and is, therefore, under common conditions only suitable for use near the locality of its manufacture, its weight being so increased by the water as to preclude the profitable transportation of such a low-priced product, on account of the freight on this extra weight. Sulphite is either sold in similar shape, first having had a portion of the water removed by pressure, or else dried by steam in rolls like paper; soda fiber is ordinarily so sold, though sometimes in a partially wet state like sulphite.

Since 1867 the ground wood manufacture has developed until in 1900 there were 91 plants producing

280,052 tons for sale, and 77 mills making 306,322 tons for their own use. Soda fiber was first made in the United States experimentally in 1854 or 1855; the first soda-fiber plant began operations in 1862 or 1863, and the earliest one still in existence, in 1869. In 1900, 20 establishments were manufacturing for sale 99,014 tons, and 16 establishments were producing for their own use 78,110 tons. The first sulphite plant was started shortly after the Civil War, though a general use of the fiber began some years later, about 1884. In 1900, 40 mills produced 271,585 tons to sell, and 29 establishments made 144,452 tons for their own use.

The manufacture of ground wood pulp, as well as the use of the large Fourdrinier and cylinder machines, would be impossible without the modern transformers of energy. The grinding of wood is usually accomplished by water wheels commonly fitted directly with the stones by which the wood is converted into pulp. From 75 to 100 horsepower per ton of wood pulp is required each twenty-four hours for these grinders and the necessary auxiliary machinery. For the paper machines steam is the most satisfactory power, on account of the constant and easily governed speed of the steam engine, whereby uniformity in the thickness of the paper can be secured. Water power, on the other hand, is sure to vary in volume and pressure, and can not be quickly enough controlled to make the flow of pulp so uniform. Furthermore, in using steam engines for the machines, the exhaust is utilized in the cylinders which dry the paper, and waste is thus prevented. Although many machines were formerly run by water, this agency is rapidly being supplanted by steam. In the preparation or beating of stock and all general work about the mill, however, water power is more economical than any other unless steam is produced by natural gas.

Within the last decade electric power is being more and more used in this, as in other industries, and it seems destined to play a still larger part. The most extensive and complete system now in use is installed in the Millinocket plant of the Great Northern Paper Company, in Maine, where the three generators, shown in figure 11, are each driven by a pair of turbine water wheels, furnishing in all about 4,500 horsepower; they drive all the machinery of the mill except the Fourdrinier machines, which are run by steam engines, and the pulp grinders, which are directly connected to turbines.

The statistics for the paper and pulp industry, as reported at the census of 1900, are shown in detail in Table 7. This table presents separate totals for each state in which there were 3 or more establishments, and groups the statistics for other states so as not to disclose the operations of individual establishments. The establishments are classified according to the character of the ownership, which shows that 144 were

owned by individuals, 135 by firms or limited partnerships, and 484 by corporations. The employees are segregated so as to show for salaried officials and wage-earners, separately, the number and salaries or wages of men, women, and children, respectively, and also the average number of wage-earners employed during each month of the year. Separate totals are shown for the

quantity and cost of the different kinds of materials and for the quantity and value of the various classes of products of the industry. A presentation of the machinery and power is made, and the 763 establishments are grouped according to the number of employees in each.

TABLE 7.—PAPER AND

	United States.	Connecticut.	Delaware.	Illinois.	Indiana.	Iowa.	Maine.	Maryland.	
1	Number of establishments	763	49	6	15	39	4	35	21
2	Character of organization:								
3	Individual	144	20		3	3		1	8
4	Firm and limited partnership	135	7	3	1	3	1	4	4
5	Incorporated company	484	22	3	11	33	3	30	9
6	Capital:								
7	Total	\$167,507,713	\$3,968,152	\$2,143,108	\$1,554,858	\$5,379,227	\$182,045	\$17,473,160	\$2,720,877
8	Land	\$21,467,286	\$445,655	\$173,200	\$105,935	\$371,615	\$20,000	\$2,671,885	\$127,142
9	Buildings	\$35,440,184	\$1,048,294	\$337,775	\$204,877	\$1,141,339	\$10,000	\$3,866,120	\$715,396
10	Machinery, tools, and implements	\$60,351,068	\$1,236,672	\$1,285,317	\$550,762	\$2,439,153	\$124,400	\$6,148,974	\$1,147,920
11	Cash and sundries	\$50,249,177	\$1,237,531	\$280,816	\$633,234	\$1,427,070	\$27,645	\$4,780,681	\$730,419
12	Proprietors and firm members	431	36	6	6	12	2	12	11
13	Salaried officials, clerks, etc.:								
14	Total number	2,935	115	19	35	134	11	258	35
15	Total salaries	\$4,500,311	\$151,600	\$61,675	\$37,370	\$186,394	\$11,770	\$445,348	\$58,793
16	Officers of corporations—								
17	Number	624	24	4	13	46	2	40	6
18	Salaries	\$1,619,878	\$41,896	\$40,000	\$13,520	\$69,923	\$4,700	\$115,281	\$80,929
19	General superintendents, managers, clerks, etc.—								
20	Total number	2,311	91	15	22	88	9	218	29
21	Total salaries	\$2,881,033	\$109,704	\$21,675	\$23,850	\$116,466	\$7,070	\$330,067	\$27,864
22	Men—								
23	Number	2,063	79	14	22	78	7	204	29
24	Salaries	\$2,760,863	\$104,576	\$21,375	\$23,850	\$112,289	\$6,520	\$323,777	\$27,864
25	Women—								
26	Number	248	12	1		10	2	14	
27	Salaries	\$120,170	\$5,128	\$300		\$4,177	\$550	\$6,290	
28	Wage-earners, including pieceworkers, and total wages:								
29	Greatest number employed at any one time during the year	58,316	1,657	484	716	2,189	221	5,848	1,165
30	Least number employed at any one time during the year	45,257	1,272	416	566	1,732	137	4,408	1,003
31	Average number	49,646	1,425	451	623	1,816	180	4,851	937
32	Wages	\$20,746,426	\$633,413	\$193,783	\$250,303	\$723,972	\$63,589	\$2,162,972	\$326,474
33	Men, 16 years and over—								
34	Average number	41,547	1,157	372	577	1,720	132	4,560	839
35	Wages	\$18,753,326	\$562,523	\$175,808	\$239,318	\$698,245	\$55,374	\$2,082,923	\$308,543
36	Women, 16 years and over—								
37	Average number	7,930	268	79	37	93	28	291	98
38	Wages	\$1,958,135	\$70,890	\$17,975	\$9,002	\$25,227	\$4,964	\$80,049	\$17,931
39	Children, under 16 years—								
40	Average number	169			9	3	20		
41	Wages	\$34,965			\$1,383	\$500	\$3,251		
42	Average number of wage-earners, including pieceworkers, employed during each month:								
43	Men, 16 years and over—								
44	January	41,737	1,104	355	563	1,752	150	4,661	960
45	February	41,899	1,173	354	608	1,733	159	4,614	977
46	March	42,420	1,135	352	609	1,805	155	4,686	995
47	April	42,967	1,201	355	654	1,803	152	4,665	1,015
48	May	42,383	1,193	363	575	1,793	152	4,700	1,009
49	June	39,309	1,050	354	578	1,720	118	4,626	823
50	July	38,981	1,013	372	561	1,888	123	4,286	678
51	August	40,580	1,138	389	554	1,655	98	4,274	695
52	September	40,762	1,187	390	599	1,633	120	4,270	717
53	October	41,259	1,191	398	595	1,605	120	4,362	730
54	November	42,708	1,191	389	566	1,750	153	4,737	736
55	December	42,959	1,166	387	602	1,706	148	4,843	732
56	Women, 16 years and over—								
57	January	8,164	277	74	38	107	37	292	112
58	February	8,186	293	75	38	108	37	290	107
59	March	8,179	278	77	38	96	27	290	108
60	April	8,173	287	77	32	97	23	286	107
61	May	8,108	276	78	32	95	24	281	108
62	June	6,275	169	79	38	94	24	285	100
63	July	6,913	170	80	38	81	21	301	94
64	August	8,068	294	80	38	79	33	302	88
65	September	8,087	287	82	39	93	33	297	87
66	October	8,176	303	79	39	78	29	289	86
67	November	8,336	298	81	39	96	29	283	89
68	December	8,495	290	82	39	94	29	279	89
69	Children, under 16 years—								
70	January	170			7	4	25		
71	February	176			10	4	25		
72	March	169			10	4	15		
73	April	164			7	4	15		
74	May	175			8	4	20		
75	June	166			9	2	20		
76	July	154			10	2	10		
77	August	168			8	2	10		
78	September	168			8	2	25		
79	October	173			10	2	25		
80	November	178			12	3	25		
81	December	182			10	4	25		
82	Miscellaneous expenses—								
83	Total	\$10,184,106	\$279,962	\$90,785	\$72,650	\$226,156	\$13,350	\$1,394,967	\$105,571
84	Rent of works	\$358,338	\$3,255	\$3,573	\$23,050	\$5,573	\$2,500	\$199,251	\$1,983
85	Taxes, not including internal revenue	\$977,877	\$19,521	\$5,168	\$4,365	\$25,792	\$115	\$122,071	\$9,621
86	Rent of offices, insurance, interest, and all sundry expenses not hitherto included	\$8,527,045	\$256,986	\$85,617	\$46,235	\$192,791	\$10,735	\$1,067,754	\$91,830
87	Contract work	\$320,846	\$200			\$2,000		\$5,891	\$2,137

PAPER AND PULP.

PULP, BY STATES: 1900.

Massachu- setts.	Michigan.	New Hamp- shire.	New Jersey.	New York.	Ohio.	Oregon.	Pennsyl- vania.	Vermont.	Virginia.	West Virginia.	Wisconsin.	All other states. ¹	
93	27	29	34	179	51	5	73	27	7	6	47	16	I
13	3	3	7	39	5		81	3			3	2	2
13	3	7	7	44	6		20	6			1	4	3
67	21	19	20	96	40	4	22	18	7	5	44	10	4
\$26,692,922	\$4,505,741	\$8,163,081	\$3,670,717	\$37,849,390	\$7,872,913	\$2,161,186	\$16,424,107	\$4,853,806	\$2,281,903	\$920,463	\$16,580,140	\$2,603,917	5
\$3,672,058	\$350,219	\$830,300	\$419,716	\$6,338,909	\$919,935	\$185,162	\$925,950	\$1,162,959	\$79,450	\$260,350	\$2,157,253	\$295,443	6
\$5,805,874	\$973,918	\$1,435,360	\$776,201	\$7,880,814	\$1,585,371	\$394,040	\$2,732,790	\$997,646	\$505,180	\$196,738	\$4,143,680	\$548,521	7
\$7,156,007	\$1,660,725	\$2,074,698	\$1,442,276	\$12,239,407	\$2,661,501	\$1,035,550	\$7,289,030	\$1,378,484	\$1,216,506	\$302,245	\$6,773,753	\$1,287,776	8
\$10,158,383	\$1,520,879	\$2,922,813	\$1,032,524	\$10,839,200	\$2,705,906	\$543,434	\$6,456,337	\$1,314,717	\$480,767	\$167,130	\$3,505,454	\$472,177	9
35	9	20	25	129	19	3	74	16		2	3	11	10
510	107	113	93	604	196	28	281	88	34	22	199	53	11
\$861,152	\$142,812	\$173,060	\$162,783	\$857,362	\$277,984	\$101,417	\$885,478	\$129,498	\$58,250	\$25,540	\$307,927	\$63,443	12
80	29	14	29	139	43	8	37	22	10	9	55	14	13
\$273,675	\$57,583	\$43,326	\$85,600	\$297,212	\$127,660	\$82,307	\$115,733	\$35,308	\$31,760	\$14,000	\$118,560	\$20,850	14
430	78	99	64	465	153	20	244	66	24	13	144	39	15
\$587,477	\$85,229	\$129,734	\$77,138	\$561,450	\$150,324	\$19,110	\$269,745	\$94,130	\$26,500	\$11,540	\$189,367	\$42,593	16
380	69	86	57	429	118	18	221	51	24	13	128	36	17
\$561,288	\$81,225	\$124,202	\$73,518	\$545,751	\$132,038	\$18,620	\$257,445	\$86,908	\$26,500	\$11,540	\$180,864	\$41,213	18
50	9	13	7	36	85	2	23	15			16	3	19
\$26,189	\$4,004	\$5,532	\$3,620	\$15,699	\$18,286	\$490	\$12,300	\$7,222			\$9,003	\$1,880	20
10,720	2,309	2,755	1,321	10,752	3,679	861	5,526	1,467	460	314	5,019	853	21
8,057	1,837	2,123	1,124	8,190	3,160	631	4,309	1,107	386	257	3,939	603	22
9,061	2,014	2,391	1,190	9,268	3,184	716	4,840	1,216	302	281	4,240	660	23
\$3,938,400	\$700,826	\$1,036,856	\$553,463	\$4,099,771	\$1,118,040	\$282,896	\$1,989,128	\$571,018	\$102,938	\$98,329	\$1,649,010	\$251,190	24
5,626	1,534	2,223	1,030	8,811	2,542	708	4,033	1,129	242	263	3,437	612	25
\$1,004,087	\$608,722	\$988,936	\$517,783	\$3,995,068	\$971,232	\$281,003	\$1,809,391	\$545,066	\$92,145	\$94,593	\$1,480,633	\$241,933	26
3,428	470	168	152	451	129		756	86	60	18	775	34	27
\$932,873	\$91,823	\$17,920	\$34,084	\$103,060	\$143,630		\$170,721	\$25,794	\$10,848	\$3,736	\$159,993	\$7,010	28
7	1		8	6	13	8	51	1			28	14	29
\$1,440	\$281		\$1,506	\$1,643	\$3,178	\$1,893	\$9,016	\$158			\$8,379	\$2,247	30
5,860	1,429	2,255	1,004	8,879	2,493	677	3,889	1,139	222	274	3,348	633	31
5,856	1,461	2,222	1,019	8,987	2,562	696	3,895	1,136	215	278	3,306	618	32
5,861	1,533	2,315	1,032	9,083	2,603	668	3,920	1,200	207	273	3,320	609	33
5,893	1,494	2,349	1,045	9,281	2,606	663	3,996	1,262	354	269	3,413	597	34
5,836	1,523	2,298	1,055	9,303	2,595	656	4,043	1,220	366	261	3,447	655	35
4,038	1,523	2,105	974	8,862	2,488	681	3,993	1,047	257	252	3,251	609	36
4,007	1,508	2,072	983	8,471	2,463	685	4,004	900	215	257	3,434	571	37
5,714	1,544	2,081	1,014	8,307	2,530	706	4,134	1,078	219	272	3,583	595	38
5,753	1,506	2,109	1,067	8,226	2,489	818	4,151	1,107	228	255	3,595	586	39
5,907	1,632	2,265	1,074	8,448	2,505	735	4,130	1,108	225	242	3,434	613	40
6,018	1,626	2,359	1,054	8,920	2,552	776	4,120	1,135	219	257	3,526	624	41
6,168	1,623	2,305	1,041	8,967	2,638	734	4,121	1,125	222	258	3,570	635	42
3,616	475	165	144	480	637		755	87	62	18	749	39	43
3,586	465	163	140	481	695		748	88	66	18	740	48	44
3,566	495	165	144	471	700		751	88	63	18	750	54	45
3,588	479	161	143	487	684		750	91	59	18	753	61	46
3,522	463	173	149	481	670		750	86	57	18	766	49	47
2,190	463	172	146	423	504		732	80	58	18	671	19	48
2,654	476	167	152	433	492		764	84	57	18	812	19	49
3,552	474	168	152	426	619		763	89	57	18	825	18	50
3,587	477	175	152	408	626		757	84	57	18	810	18	51
3,652	488	172	167	428	634		767	83	60	18	786	18	52
3,737	503	175	167	433	644		766	88	60	18	799	31	53
3,850	493	164	169	461	640		771	85	58	18	811	43	54
8	1		8	6	11	5	54	1			26	14	55
8	1		8	6	11	8	52	2			27	11	56
8	1		8	6	11	12	50	4			26	14	57
8	1		8	6	11	0	54	2			28	14	58
8	1		8	6	13	10	52	2			29	14	59
8	2		8	6	13	11	51				26	15	60
6	2		8	6	13	7	48				29	13	61
6	2		8	6	15	5	51				30	13	62
6	2		8	6	14	10	47				27	13	63
8	1		8	6	14	12	49				25	13	64
8	2		8	6	13	5	51				27	13	65
8	2		8	6	13	10	49				34	14	66
\$1,693,505	\$264,373	\$539,955	\$242,798	\$2,398,994	\$479,386	\$147,417	\$1,090,321	\$265,569	\$57,829	\$44,193	\$664,599	\$111,739	67
\$9,654	\$3,420	\$1,910	\$16,606	\$30,028	\$5,508	\$1,800	\$22,010	\$975	\$400		\$27,671	\$2,144	68
\$262,885	\$24,957	\$50,995	\$16,356	\$181,954	\$40,881	\$5,927	\$64,069	\$26,306	\$6,388	\$3,612	\$97,530	\$9,114	69
\$1,416,117	\$209,030	\$365,898	\$190,139	\$2,086,933	\$432,997	\$139,690	\$973,712	\$237,313	\$51,041	\$40,581	\$532,415	\$100,181	70
\$4,899	\$26,966	\$121,152	\$19,692	\$99,429			\$30,530	\$975			\$6,975		71

¹ Includes establishments distributed as follows: California, 2; Colorado, 2; Georgia, 2; Kansas, 2; Minnesota, 2; North Dakota, 1; South Carolina, 1; Texas, 2; Washington, 2.

TABLE 7.—PAPER AND PULP,

	United States.	Connecticut.	Delaware.	Illinois.	Indiana.	Iowa.	Maine.	Maryland.	
Materials used:									
72	Total cost	\$70,530,236	\$1,982,080	\$1,028,274	\$798,870	\$2,470,623	\$106,615	\$7,118,946	\$1,750,910
Wood—									
Domestic spruce for ground wood—									
73	Cords	598,229				6,300	110,813		
74	Cost	\$2,855,872				\$49,897	\$577,183		
Domestic spruce for sulphite and soda fiber—									
75	Cords	561,889					154,546	23,229	
76	Cost	\$2,731,070					\$747,982	\$147,615	
Canadian spruce for ground wood—									
77	Cords	120,820				9,000	16,338		
78	Cost	\$868,187				\$68,500	\$136,064		
Canadian spruce for sulphite and soda fiber—									
79	Cords	228,264				1,473	4,250		
80	Cost	\$1,404,308				\$4,419	\$34,012		
Domestic poplar wood for soda fiber—									
81	Cords	236,820		21,320		20,301	49,317	4,616	
82	Cost	\$1,103,132		\$131,467		\$79,707	\$199,377	\$30,865	
Canadian poplar wood for soda fiber—									
83	Cords	20,139					539		
84	Cost	\$90,962					\$1,716		
Other pulp wood for ground wood—									
85	Cords	67,791			864	4,157	6,544	10,970	
86	Cost	\$293,304			\$3,456	\$17,913	\$21,757	\$73,248	
Other pulp wood for sulphite and soda fiber—									
87	Cords	152,364						9,653	
88	Cost	\$490,681						\$62,577	
Rags, including cotton and flax waste and sweepings—									
89	Tons	234,514	7,987	3,637	974	1,606	730	7,894	1,534
90	Cost	\$6,595,427	\$253,388	\$35,636	\$11,956	\$46,523	\$7,650	\$241,359	\$21,017
Old or waste paper—									
91	Tons	356,193	45,446	2,105	12,681	25,925	1,274	1,010	3,939
92	Cost	\$4,869,409	\$553,024	\$43,690	\$136,176	\$360,374	\$9,258	\$16,489	\$51,881
Manila stock, including jute bagging, rope, waste, threads, etc.—									
93	Tons	99,301	7,710		900	5,580	1,005	1,380	
94	Cost	\$2,437,256	\$142,882		\$12,600	\$108,973	\$16,797	\$35,400	
Straw—									
95	Tons	367,305			75,350	119,414	12,350	6,893	
96	Cost	\$1,395,659			\$292,046	\$470,464	\$46,704	\$22,381	
Fiber—									
Ground wood pulp purchased—									
97	Tons	261,962	2,403	222	1,500	7,530	48,740	1,820	
98	Cost	\$4,361,211	\$41,677	\$4,999	\$45,000	\$157,308	\$599,129	\$88,234	
Soda wood fiber purchased—									
99	Tons	94,042	920	7,330		1,153	8,718	150	
100	Cost	\$3,430,309	\$42,521	\$364,963		\$52,083	\$369,079	\$9,000	
Sulphite wood fiber purchased—									
101	Tons	273,194	5,049	2,697	187	5,258	48	36,541	16,467
102	Cost	\$10,112,189	\$220,392	\$117,236	\$7,007	\$188,040	\$1,440	\$1,061,125	\$684,444
Other chemical fiber purchased—									
103	Tons	14,808	57						
104	Cost	\$465,255	\$3,208						
105	Chemicals	\$6,140,478	\$114,059	\$112,261	\$42,013	\$196,105	\$7,432	\$688,488	\$193,851
106	Clay	\$1,493,469	\$23,722	\$36,422	\$800	\$11,922		\$163,303	\$41,020
107	Colors	\$705,355	\$68,056	\$3,135	\$3,084	\$14,617	\$100	\$30,057	\$6,545
108	Sizing	\$826,245	\$20,734	\$3,042	\$1,189	\$12,105	\$5	\$91,146	\$6,083
109	All other stock	\$317,075	\$16,610	\$904	\$10,863	\$34,252		\$76,716	\$5,229
110	Fuel	\$6,379,797	\$194,793	\$77,039	\$130,004	\$197,668	\$17,597	\$658,679	\$128,151
111	Rent of power and heat	\$611,906	\$16,959	\$1,500	\$4,175	\$11,160		\$74,922	\$120
112	Mill supplies	\$2,696,797	\$94,501	\$40,130	\$40,915	\$59,658	\$3,960	\$291,399	\$36,838
113	All other materials	\$4,420,507	\$55,398		\$17,040	\$161,298	\$2,000	\$540,526	\$113,416
114	Freight	\$2,433,676	\$115,156	\$800	\$40,046	\$167,037	\$10,529	\$381,140	\$23,055
Products:									
115	Total value	\$127,326,162	\$3,565,021	\$1,599,718	\$1,431,618	\$4,170,497	\$243,776	\$13,223,275	\$2,589,540
News paper—									
In rolls, for printing—									
116	Tons	454,572				3,500	112,995	410	
117	Value	\$15,754,992				\$176,000	\$3,756,800	\$24,800	
In sheets, for printing—									
118	Tons	114,640				2,900	9,743	400	
119	Value	\$4,336,882				\$145,000	\$365,450	\$24,948	
Book paper—									
Book—									
120	Tons	282,093	2,427	11,981		3,387	30,041	14,873	
121	Value	\$19,466,304	\$264,041	\$903,422		\$253,868	\$2,660,211	\$1,017,161	
Cover—									
122	Tons	18,749	3,620	500					
123	Value	\$1,665,376	\$405,247	\$37,500					
Plate, lithograph, map, woodcut, etc.—									
124	Tons	22,366	29	1,440		106			
125	Value	\$2,018,958	\$6,960	\$115,550		\$7,000			
Cardboard, bristol board, card middles, tickets, etc.—									
126	Tons	28,494	1,773	550		117			
127	Value	\$1,719,813	\$80,223	\$41,250		\$10,000			
Fine paper—									
Writing paper—									
128	Tons	90,204	2,001						
129	Value	\$12,222,870	\$323,672						
All other fine paper—									
130	Tons	22,503	297						
131	Value	\$3,673,104	\$37,740						

BY STATES: 1900—Continued.

Massachu- setts.	Michigan.	New Hamp- shire.	New Jersey.	New York.	Ohio.	Oregon.	Pennsyl- vania.	Vermont.	Virginia.	West Virginia.	Wisconsin.	All other states. ¹	
\$11,918,802	\$2,707,827	\$3,953,384	\$1,715,312	\$14,563,222	\$3,768,672	\$582,078	\$6,374,315	\$1,684,922	\$410,640	\$274,316	\$6,712,749	\$628,830	72
8,052	4,517	41,085	.....	225,327	5,000	100,292	2,779	24,089	.....	5,729	66,296	3,000	73
\$15,912	\$16,768	\$242,055	.....	\$1,260,593	\$32,500	\$72,170	\$16,895	\$130,179	.....	\$30,496	\$398,715	\$12,509	74
18,194	7,884	68,006	.....	138,098	.....	55,239	13,918	7,427	.....	11,286	58,659	2,536	75
\$94,090	\$30,947	\$413,141	.....	\$724,822	.....	\$37,993	\$38,609	\$41,666	\$17,906	\$39,128	\$350,224	\$16,952	76
8,465	.....	4,089	.....	54,923	2,000	350	.....	18,770	.....	.....	6,885	.....	77
\$73,360	.....	\$24,756	.....	\$372,162	\$18,000	\$1,800	.....	\$122,850	.....	.....	\$50,695	.....	78
5,809	18,035	63,050	.....	86,606	.....	.....	10,000	6,672	.....	.....	17,869	.....	79
\$39,419	\$70,521	\$474,578	.....	\$573,210	.....	.....	\$50,000	\$44,363	.....	.....	\$118,786	.....	80
3,050	4,718	.....	.....	32,114	10,000	.....	81,504	.....	8,513	.....	1,367	.....	81
\$17,941	\$30,300	.....	.....	\$180,925	\$34,000	.....	\$347,026	.....	\$38,596	.....	\$12,888	.....	82
.....	.....	.....	.....	9,628	2,000	.....	7,966	.....	.....	.....	.....	.....	83
.....	.....	.....	.....	\$56,600	\$8,000	.....	\$24,646	.....	.....	.....	.....	.....	84
900	283	720	.....	9,466	.....	4,250	6,926	2,262	3,200	1,519	10,608	5,127	85
\$4,335	\$740	\$3,430	.....	\$40,210	.....	\$14,730	\$33,519	\$11,028	\$7,200	\$4,239	\$35,029	\$22,470	86
100	3,913	.....	.....	.....	12,000	6,000	58,757	.....	.....	.....	49,375	12,566	87
\$600	\$12,088	.....	.....	.....	\$12,000	\$25,000	\$170,155	.....	.....	.....	\$175,214	\$33,097	88
86,715	4,902	2,700	7,620	17,899	19,416	700	34,969	2,363	1,433	.....	29,049	2,386	89
\$3,306,599	\$137,772	\$61,573	\$159,786	\$420,870	\$374,643	\$10,500	\$626,705	\$43,978	\$39,981	.....	\$717,409	\$28,082	90
42,866	32,836	6,327	37,244	51,691	26,087	1,350	46,697	1,488	3,436	1,829	7,725	4,287	91
\$815,272	\$700,270	\$121,466	\$428,581	\$564,463	\$309,884	\$15,350	\$465,872	\$19,278	\$35,565	\$14,900	\$165,727	\$36,889	92
10,955	527	2,947	13,947	23,673	14,994	700	7,851	1,458	65	1,900	3,339	370	93
\$236,238	\$7,160	\$64,634	\$337,870	\$646,776	\$395,370	\$12,200	\$270,466	\$28,848	\$700	\$66,200	\$58,892	\$5,200	94
26	13,193	.....	.....	17,624	93,127	3,500	3,606	100	.....	2,700	6,307	13,115	95
\$197	\$49,242	.....	.....	\$130,695	\$274,447	\$14,000	\$24,099	\$2,000	.....	\$15,900	\$21,107	\$32,377	96
21,038	4,054	21,266	253	93,749	5,186	.....	5,340	10,579	2,160	.....	36,989	33	97
\$400,299	\$81,267	\$338,316	\$6,145	\$1,485,176	\$96,899	.....	\$116,993	\$171,628	\$69,000	.....	\$708,130	\$1,011	98
25,493	7,547	2,396	2	20,447	4,563	.....	9,513	373	497	.....	4,890	.....	99
\$1,069,036	\$314,947	\$95,946	\$84	\$378,745	\$211,015	.....	\$284,449	\$14,863	\$20,057	.....	\$204,021	.....	100
36,912	14,476	12,123	1,490	66,769	12,647	17	15,450	12,790	560	.....	32,252	1,521	101
\$1,709,304	\$335,682	\$418,680	\$53,721	\$2,519,066	\$410,693	\$595	\$527,624	\$440,708	\$22,390	.....	\$1,328,710	\$64,832	102
1,861	20	21	.....	8,554	4,295	.....	.....	.....	.....	.....	.....	.....	103
\$99,566	\$1,052	\$372	.....	\$212,027	\$149,030	.....	.....	.....	.....	.....	.....	.....	104
\$730,424	\$195,947	\$459,303	\$124,413	\$1,021,512	\$363,509	\$37,571	\$376,906	\$79,737	\$70,666	\$35,270	\$633,944	\$107,207	105
\$940,267	\$73,533	\$52,902	\$9,675	\$296,241	\$50,006	\$11,770	\$189,073	\$23,363	\$9,069	.....	\$150,056	\$15,285	106
\$152,301	\$23,210	\$24,000	\$8,702	\$119,124	\$56,254	.....	\$5,956	\$28,924	\$5,128	\$225	\$74,745	\$10,078	107
\$348,650	\$14,411	\$11,421	\$4,472	\$94,993	\$38,207	.....	\$1,730	\$34,700	\$10,491	.....	\$1,316	.....	108
\$90,556	\$10,017	\$36,759	\$77,560	\$114,827	\$32,900	.....	\$3,701	\$147,779	\$23,219	.....	\$59,168	.....	109
\$1,035,131	\$205,273	\$490,765	\$206,454	\$1,349,830	\$462,540	.....	\$99,387	\$624,350	\$43,275	\$29,085	\$594,214	\$124,926	110
\$219,080	\$1,042	\$10,800	\$5,080	\$89,122	\$32,755	.....	\$31,600	\$3,016	\$3,300	.....	\$31,539	\$12,511	111
\$314,058	\$119,362	\$154,014	\$45,618	\$623,662	\$123,563	.....	\$53,124	\$137,876	\$11,279	\$7,318	\$310,798	\$24,458	112
\$570,636	\$96,947	\$407,167	\$195,069	\$391,321	\$107,378	.....	\$78,000	\$90,390	\$15,999	\$14,300	\$391,577	\$32,390	113
\$235,061	\$119,379	\$47,206	\$52,182	\$396,250	\$134,979	.....	\$6,743	\$561,286	\$46,439	\$2,036	\$51,075	\$15,397	114
\$22,141,461	\$1,217,869	\$7,244,733	\$3,195,302	\$26,715,628	\$6,543,513	\$1,305,696	\$12,267,900	\$3,384,773	\$850,336	\$527,527	\$10,895,676	\$1,212,353	115
22,194	.....	45,643	.....	162,153	4,239	18,620	243	22,685	.....	.....	58,850	3,040	116
\$840,705	.....	\$1,606,955	.....	\$5,405,462	\$213,159	\$744,306	\$12,128	\$222,685	.....	.....	\$2,020,102	\$127,600	117
.....	150	12,235	.....	42,804	3,278	2,796	788	3,481	1,320	.....	31,225	3,520	118
.....	\$10,200	\$471,649	.....	\$1,473,561	\$186,397	\$111,840	\$39,415	\$108,133	\$72,600	.....	\$1,233,289	\$144,400	119
39,551	44,438	9,137	3,650	27,611	13,801	.....	52,366	.....	.....	.....	25,206	3,119	120
\$3,120,867	\$2,048,178	\$618,145	\$249,640	\$1,700,565	\$942,642	.....	\$3,849,919	.....	.....	.....	\$1,615,549	\$216,593	121
4,035	2,964	.....	.....	3,649	2,474	.....	1,414	.....	.....	.....	93	.....	122
\$367,001	\$221,084	.....	.....	\$300,509	\$186,624	.....	\$136,297	.....	.....	.....	\$5,114	.....	123
11,879	809	.....	.....	200	247	.....	7,356	.....	.....	.....	300	.....	124
\$1,007,466	\$31,528	.....	.....	\$16,000	\$16,749	.....	\$743,705	.....	.....	.....	\$24,000	.....	125
13,564	.....	1,933	.....	4,332	160	.....	727	4,481	799	.....	58	.....	126
\$1,006,454	.....	\$105,908	.....	\$184,315	\$12,680	.....	\$36,778	\$181,671	\$51,223	.....	\$9,311	.....	127
54,791	1,592	.....	60	519	3,315	.....	16,824	.....	720	50	10,332	.....	128
\$8,751,556	\$161,427	.....	\$6,000	\$70,115	\$444,479	.....	\$1,379,594	.....	\$55,506	\$6,000	\$1,024,521	.....	129
13,264	.....	.....	.....	706	780	.....	3,120	.....	.....	.....	3,659	677	130
\$2,547,072	.....	.....	.....	\$66,844	\$133,693	.....	\$369,917	.....	.....	.....	\$464,678	\$59,160	131

¹Includes establishments distributed as follows: California, 2; Colorado, 2; Georgia, 2; Kansas, 2; Minnesota, 2; North Dakota, 1; South Carolina, 1; Texas, 2; Washington, 2.

TABLE 7.—PAPER AND PULP,

	United States.	Connecticut.	Delaware.	Illinois.	Indiana.	Iowa.	Maine.	Maryland.
Products—Continued:								
Wrapping paper—								
Manila (rope, jute, tag, etc.)—								
182	Tons.....	89,419	2,790		5,010			
183	Value.....	\$5,929,764	\$185,322		\$264,429			
Heavy wrapping (mill wrappers, etc.)—								
184	Tons.....	82,875	3,064		3,158		953	69
185	Value.....	\$4,143,240	\$184,668		\$88,950		\$27,830	\$2,260
Straw—								
186	Tons.....	91,794			8,621	4,790		850
187	Value.....	\$2,027,518			\$178,429	\$160,776		\$25,789
Bogus or wood manila, all grades—								
188	Tons.....	203,826	1,832		5,563		31,849	4,856
189	Value.....	\$9,148,677	\$81,426		\$225,082		\$1,608,005	\$288,006
All other wrapping—								
140	Tons.....	67,338	6,533		2,987	658	200	6,857
141	Value.....	\$3,293,174	\$892,481		\$104,314	\$29,700	\$6,000	\$456,868
Boards—								
Binders and trunk—								
142	Tons.....	27,774	6,260		2,720			350
143	Value.....	\$858,745	\$176,650		\$87,600			\$12,750
Leather—								
144	Tons.....	11,351	2,727		54		1,540	
145	Value.....	\$677,807	\$110,717		\$5,400		\$188,322	
Press and album—								
146	Tons.....	3,745	1,886					
147	Value.....	\$325,017	\$211,608					
Wood pulp—								
148	Tons.....	44,187			900	8,137	11,802	
149	Value.....	\$1,406,130			\$38,250	\$212,600	\$336,835	
Strawboard—								
150	Tons.....	157,534	4,284		20,100	70,081		4,822
151	Value.....	\$8,187,342	\$107,645		\$382,459	\$1,350,636		\$98,969
News—								
152	Tons.....	32,119	4,520			2,102		
153	Value.....	\$930,581	\$135,007			\$44,600		
All other boards—								
154	Tons.....	88,907	11,135		16,428	10,681	150	
155	Value.....	\$2,967,747	\$417,072		\$398,372	\$341,045	\$4,900	
Other paper products—								
Tissue—								
156	Tons.....	28,406	1,740			325		
157	Value.....	\$3,486,652	\$288,378			\$31,065		
Blotting—								
158	Tons.....	4,351	635					
159	Value.....	\$580,750	\$99,969					
Building, roofing, asbestos, and sheathing—								
160	Tons.....	96,915	1,789	700		2,500		456
161	Value.....	\$3,025,967	\$41,147	\$13,200		\$50,000		\$13,308
Carpet lining—								
162	Tons.....	16,622	2		3,650	58	1,850	
163	Value.....	\$448,230	\$52		\$72,932	\$4,662	\$27,000	
Hanging—								
164	Tons.....	54,330	113					4,124
165	Value.....	\$2,265,345	\$11,208					\$139,791
Curtain—								
166	Tons.....	208						
167	Value.....	\$11,495						
Miscellaneous—								
168	Tons.....	32,271	400	365		3,850		58
169	Value.....	\$2,336,116	\$37,713	\$58,433		\$235,952		\$4,746
Ground wood pulp—								
Made for own use—								
170	Tons.....	306,322				6,493	50,924	
Made to sell as such—								
171	Tons.....	280,052				3,925	78,954	
172	Value.....	\$4,433,699				\$75,870	\$1,168,887	
Soda fiber—								
Made for own use—								
173	Tons.....	78,100					11,206	1,245
Made to sell as such—								
174	Tons.....	99,014		8,823		12,614	32,956	2,702
175	Value.....	\$3,612,602		\$480,818		\$378,409	\$1,269,141	\$139,896
Sulphite fiber—								
Made for own use—								
176	Tons.....	144,452					30,436	
Made to sell as such—								
177	Tons.....	271,585					27,143	15,987
178	Value.....	\$10,451,400					\$1,390,601	\$670,584
179	All other products, value	\$919,415	\$71,425			\$25,250		\$26,000
Comparison of products:								
180	Number of establishments reporting for both years.....	439	84	6	8	12	1	19
181	Value for census year.....	\$78,472,483	\$2,777,764	\$1,599,718	\$794,909	\$1,848,848	\$102,778	\$7,589,224
182	Value for preceding business year.....	\$70,268,892	\$2,518,983	\$1,268,175	\$678,468	\$1,574,048	\$85,745	\$7,514,724
Machinery:								
Paper machines—								
Fourdrinier—								
183	Number.....	663	19	9		10	56	16
184	Total width, inches.....	56,436	1,440	683		930	5,100	1,408
Cylinder—								
185	Number.....	509	51	2	23	38	6	22
186	Total width, inches.....	36,860	2,752	146	1,624	2,926	368	1,554
187	Wet, number.....	1,049	20	2		19	1	9

PAPER AND PULP.

BY STATES: 1900—Continued.

Massachu- setts.	Michigan.	New Hamp- shire.	New Jersey.	New York.	Ohio.	Oregon.	Pennsyl- vania.	Vermont.	Virginia.	West Virginia.	Wisconsin.	All other states. ¹
6,697 \$546,388	4,840 \$233,311	1,956 \$119,862	7,377 \$711,312	22,760 \$1,419,659	18,579 \$1,368,700	300 \$24,000	6,980 \$585,224	5,722 \$188,826	600 \$60,000	5,698 \$257,331	260 \$10,400	132. 133.
10,254 \$668,118	4,976 \$200,506	980 \$32,219	3 \$195	38,556 \$2,164,495	5,646 \$175,473	90 \$3,960	5,921 \$265,034	873 \$23,134	800 \$24,000	6,493 \$301,600	1,089 \$30,898	134 135.
1,187 \$9,500	2,805 \$40,150	8,329 \$177,138	14,650 \$543,084	10,619 \$211,234	2,184 \$75,000	1,805 \$54,110	11,457 \$557,003	13,700 \$761,832	2,861 \$52,897	3,600 \$99,200	136. 137	
2,256 \$107,762	4,663 \$215,423	13,963 \$629,401	3,000 \$90,000	74,724 \$3,092,370	7,610 \$324,038	4,500 \$225,000	11,457 \$557,003	13,700 \$761,832	17,931 \$690,929	5,872 \$256,860	138 139	
1,844 \$109,523	3,586 \$117,360	84 \$2,940	250 \$37,000	6,095 \$246,577	7,400 \$223,754	1,200 \$48,000	9,997 \$563,115	762 \$15,250	125 \$5,000	13,956 \$746,048	1,934 \$78,720	140 141
1,518 \$41,700	700 \$24,000	3,571 \$165,565	1,770 \$58,102	4,539 \$139,102	6,346 \$158,276	1,044 \$60,881	209 \$13,977	1,044 \$60,881	142 143			
2,874 \$190,794	2,049 \$116,288	68 \$4,410	1,000 \$51,000	1,000 \$51,000	1,000 \$51,000	1,000 \$51,000	1,000 \$51,000	1,000 \$51,000	144 145			
580 \$48,692	960 \$48,000	160 \$4,840	209 \$13,977	209 \$13,977	209 \$13,977	209 \$13,977	209 \$13,977	209 \$13,977	146 147			
2,846 \$144,435	5,350 \$134,500	12,133 \$411,655	300 \$6,000	2,719 \$122,355	300 \$6,000	2,719 \$122,355	300 \$6,000	2,719 \$122,355	148 149			
800 \$13,808	4,110 \$76,620	7,806 \$257,967	40,531 \$800,038	200 \$5,000	8,500 \$73,600	1,800 \$73,600	1,800 \$73,600	1,800 \$73,600	150 151			
8,620 \$511,682	641 \$19,230	292 \$3,760	15,931 \$485,205	3,775 \$103,316	221 \$6,148	1,050 \$32,000	2,236 \$55,735	2,236 \$55,735	152 153			
2,479 \$416,440	3,250 \$94,597	2,317 \$68,141	1,600 \$48,000	13,750 \$486,705	3,595 \$222,072	12,331 \$380,161	1,318 \$201,747	60 \$5,400	2,960 \$250,331	154 155		
788 \$111,627	13 \$1,380	3,973 \$939,120	4,480 \$943,877	3,845 \$768,945	639 \$62,131	1,377 \$201,747	1,018 \$180,303	180 \$29,416	1,807 \$251,400	156 157		
14,372 \$615,038	1,337 \$34,439	7,133 \$235,400	8,044 \$260,051	7,275 \$213,493	1,410 \$53,580	45,923 \$1,313,436	103 \$12,360	180 \$29,416	2,608 \$86,846	3,868 \$94,919	160 161	
4,425 \$141,499	218 \$8,380	1,076 \$32,053	3,247 \$94,764	100 \$4,000	2,223 \$67,188	4,416 \$192,731	104 \$4,680	113 \$18,000	4,415 \$246,688	273 \$5,670	162 163	
2,204 \$143,080	39,593 \$1,562,465	88 \$5,855	810 \$25,000	6,480 \$730,640	1,195 \$139,647	4,110 \$380,522	900 \$82,303	2,800 \$126,000	120 \$7,267	164 165		
1,427 \$85,025	2,971 \$143,272	2,815 \$136,122	810 \$25,000	6,480 \$730,640	1,195 \$139,647	4,110 \$380,522	104 \$4,680	113 \$18,000	4,415 \$246,688	166 167		
13,010	6,420	24,161	122,636	4,950	200	3,405	18,764	48,909	6,400	168 169		
100 \$2,000	256 \$5,284	7,577 \$205,575	122,607 \$1,396,733	954 \$15,510	954 \$15,510	1,100 \$12,100	20,389 \$460,748	6,794 \$112,331	28,396 \$478,561	170 171 172		
1,771 \$70,840	1,033 \$62,004	15,034 \$555,746	9,312 \$1,335	1,835	49,994	11,668 \$470,214	9,000 \$103,000	3,413 \$123,039	3,830	173 174 175		
3,014	6,103	7,134	48,338	2,650	15,205	3,793	4,000	1,516	6,677	35,261	1,230	176 177 178 179
7,069 \$353,332 \$165,597	6,895 \$279,223 \$233	80,718 \$2,711,373 \$24,375	76,658 \$2,779,922 \$61,892	4,370 \$174,800 \$226,124	4,051 \$223,225 \$201,724	4,000 \$160,000	1,516 \$71,233	6,677 \$186,646 \$60,000	35,261 \$1,377,392 \$2,182	1,230 \$37,650 \$45,493	179 180 181 182	
62 \$17,633,506 \$16,408,627	17 \$2,435,925 \$2,199,375	16 \$4,305,865 \$3,626,116	16 \$1,289,945 \$1,064,358	102 \$11,834,849 \$10,699,175	31 \$4,756,886 \$4,256,257	4 \$1,233,956 \$1,115,119	47 \$9,533,402 \$8,021,106	10 \$716,096 \$618,191	4 \$597,418 \$557,357	28 \$6,122,706 \$5,313,886	8 \$842,532 \$753,344	183 184 185 186 187
152 11,932	23 2,082	31 2,694	10 806	139 12,485	33 2,582	6 580	59 4,750	16 1,344	8 761	68 6,289	8 670	183 184
50 3,034 34	23 1,332 20	16 967 89	42 2,953 8	127 8,224 396	48 3,330 26	2 144 17	63 3,934 52	18 1,016 69	4 312 4	5 292 15	7 504 97	185 186 187

¹ Includes establishments distributed as follows: California, 2; Colorado, 2; Georgia, 2; Kansas, 2; Minnesota, 2; North Dakota, 1; South Carolina, 1; Texas, 2; Washington, 2.

TABLE 7.—PAPER AND PULP,

	United States.	Connecticut.	Delaware.	Illinois.	Indiana.	Iowa.	Maine.	Maryland.
Machinery—Continued:								
Beaters—								
188	Number	3,739	168	28	89	216	16	225
189	Capacity, pounds	3,343,966	144,800	28,200	62,111	227,650	9,400	217,750
Washing engines—								
190	Number	900	38	16	10	22	.....	32
191	Capacity, pounds	893,300	35,100	17,700	16,000	23,600	.....	17,200
192	Jordan or refining engines, number	1,167	59	10	27	64	5	80
For mills making their own soda or sulphite—								
Digestors—								
193	Number	426	.....	10	.....	7	.....	83
194	Total capacity, tons	3,813	.....	8	.....	45	.....	416
Boilers used for digestors—								
195	Number	307	.....	5	5	20	.....	45
196	Horsepower	45,510	.....	445	300	1,700	.....	7,325
197	Cooks per week, number	4,926	.....	222	48	126	.....	914
For mills making ground wood pulp—								
198	Grinders, number	1,168	.....	.....	.....	37	.....	178
Yearly capacity of mills:								
199	In paper, tons	2,782,219	75,663	19,050	148,950	175,309	9,700	246,583
200	In pulp, tons	1,536,431	1,200	10,000	.....	28,420	.....	330,649
Power:								
201	Number of establishments reporting	763	49	6	15	39	4	35
202	Total horsepower	764,847	14,641	4,018	9,551	28,809	1,225	92,720
Owned—								
Engines—								
Steam—								
203	Number	2,016	95	31	41	185	11	135
204	Horsepower	255,854	6,656	3,360	5,461	21,285	1,110	15,620
Gas or gasoline—								
205	Number	13	.....	.....	.....	2	.....	7
206	Horsepower	1,062	.....	.....	.....	157	.....	846
Water wheels—								
207	Number	3,209	103	8	30	28	2	402
208	Horsepower	504,762	7,965	650	4,090	2,355	100	75,839
Electric motors—								
209	Number	91	2	1	.....	1	1	10
210	Horsepower	2,729	20	8	.....	12	15	390
Other power—								
211	Number	5	.....	.....	.....	.....	.....	.....
212	Horsepower	180	.....	.....	.....	.....	.....	.....
Rented—								
213	Horsepower	3,400	.....	.....	.....	.....	.....	.....
214	Furnished to other establishments, horsepower	260	.....	.....	.....	.....	1,410	25
Establishments classified by number of persons employed, not including proprietors and firm members:								
215	Total number of establishments	763	49	6	15	39	4	35
216	No employees	1	.....	.....	.....	.....	.....	.....
217	Under 5	21	2	.....	.....	.....	.....	4
218	5 to 20	179	19	2	.....	5	1	3
219	21 to 50	230	18	.....	9	16	1	4
220	51 to 100	149	7	1	5	12	1	5
221	101 to 250	138	3	3	1	6	1	19
222	251 to 500	36	.....	.....	.....	.....	.....	2
223	501 to 1,000	9	.....	.....	.....	.....	.....	2

PAPER AND PULP.

1035

BY STATES: 1900—Continued.

Massachu- setts.	Michigan.	New Hamp- shire.	New Jersey.	New York.	Ohio.	Oregon.	Pennsyl- vania.	Vermont.	Virginia.	West Virginia.	Wisconsin.	All other states. ¹	
630	91	143	150	737	328	21	367	92	32	14	246	56	188
695,550	74,325	99,375	123,875	610,480	296,900	13,425	345,450	71,200	36,200	8,800	212,500	55,450	189
294	55	24	30	114	57	.....	75	15	7	.....	90	5	190
319,800	52,600	20,550	26,150	115,800	53,400	.....	75,150	16,800	6,200	.....	78,100	5,100	191
174	49	43	44	255	82	8	101	25	13	4	82	17	192
21	18	18	2	82	13	4	76	6	9	4	43	11	193
34	166	231	14	471	59	15	383	15	887	158	350	25	194
17	10	19	.....	49	18	6	37	4	3	2	45	11	195
1,975	1,125	6,400	.....	7,465	2,725	580	5,990	600	850	300	5,335	1,145	196
201	39	248	.....	1,000	125	72	977	30	107	45	491	156	197
42	26	77	.....	449	7	39	20	92	2	10	174	15	198
283,576	111,669	106,518	85,392	611,179	212,639	34,784	237,434	96,316	20,900	5,370	222,046	35,220	199
31,920	20,558	126,919	4,377	495,668	29,436	23,300	94,525	68,372	28,800	16,500	183,335	15,852	200
93	27	29	34	179	51	5	73	27	7	6	47	16	201
82,898	22,925	48,740	12,978	223,478	28,567	12,190	42,209	34,532	6,355	4,785	77,011	8,707	202
331	65	60	83	301	188	12	293	31	31	14	70	32	203
37,247	11,329	10,200	9,655	36,680	24,795	1,438	35,851	2,455	4,445	1,465	15,589	3,632	204
.....	.....	.....	.....	.....	2	.....	1	.....	.....	.....	.....	1	205
.....	.....	.....	.....	.....	24	.....	15	.....	.....	.....	.....	.....	206
334	92	204	43	1,021	49	38	83	166	11	17	498	50	207
44,935	11,527	38,200	3,323	191,117	3,698	10,662	5,983	32,071	1,900	3,320	61,287	4,870	208
19	5	4	.....	13	4	4	18	2	1	.....	4	.....	209
693	69	150	.....	711	50	90	360	6	10	.....	135	.....	210
.....	.....	4	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	211
.....	.....	160	.....	20	.....	.....	.....	.....	.....	.....	.....	.....	212
775	.....	20	.....	900	100	.....	50	25	.....	75	20	.....	213
20	.....	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	214
93	27	29	34	179	51	5	73	27	7	6	47	16	215
1	.....	.....	.....	6	.....	.....	1	.....	.....	.....	.....	.....	216
15	6	9	1	3	.....	.....	7	.....	.....	.....	.....	.....	217
19	8	10	8	63	3	1	23	9	.....	1	3	3	218
17	4	4	17	55	22	1	19	9	2	2	7	5	219
30	4	4	4	29	19	.....	7	5	3	2	16	6	220
11	8	3	4	17	4	2	9	3	2	1	18	2	221
.....	1	3	.....	5	2	.....	6	1	.....	.....	3	.....	222
.....	.....	.....	.....	4	1	1	1	.....	.....	.....	.....	.....	223

¹ Includes establishments distributed as follows: California, 2; Colorado, 2; Georgia, 2; Kansas, 2; Minnesota, 2; North Dakota, 1; South Carolina, 1; Texas, 2; Washington, 2.